



*Hon.^m Francisc⁹ Bacon⁹ Baro de Veru-
lam Vice-Comes S^{ti} Albani. Mortuus 9 Aprilis,
Anno Dñi . 1626. Aetate 66.*

הוה:

Et vidit Deus lucem

quod esset bona

Mundus Intellectualis

SYLVA SYLVARVM

or

A NATURALL HISTORY

In ten Centuries.

Written by the right Hon^{ble} Francis

Lo: Verulam Viscount S^t Alban.

Published after y^e Autho^rs Death

by W. RAWLEY D^r of Divi
nity. &c

Tho: Cressall sculp.

LONDON

Printed for W. Lee and are to be sould at
the Great Turke head next to the Mytre
Tavne in Fleetstreet

Anno

1651

SYLVA
SYLVARVM:

OR,
A Naturall History.

IN TEN CENTURIES.

WHEREUNTO IS NEWLY ADDED
the History *Naturall* and *Experimentall* of
LIFE and DEATH, or of the
Prolongation of Life.

BOTH WRITTEN BY THE RIGHT
Honourable FRANCIS LO. Verulam
Viscount S^r ALBAN.

Published after the Authors death,
By WILLIAM RAVVLEY Doctor in Divinity,
one of his *Majesties* Chaplaines.

Hereunto is now added an Alphabetical Table of the prin-
cipall things contained in the ten *Centuries*.

The sixt Edition.

LONDON,

Printed by J. F. for William Lee, and are to be sold at the Great
Turks Head over against *Fetter-Lane* in *Fleetstreet*. 1651.

I have been thinking of you
 very much lately and wondering
 how you are getting on. I hope
 you are well and happy. I have
 been very busy lately but I
 have managed to find some time
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 find some time to write you.

D. J. Jones
 1888



TO THE MOST HIGH
AND MIGHTY PRINCE

CHARLES,

BY THE GRACE OF GOD,

King of *Great Britaine, France, and*
Ireland, Defender of the Faith, &c.

May it please your most Excellent Majesty;



He whole Body of the *Naturall History*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Majesty*, in his Book *De Ventis*, about foure yeares past, when your *Majesty* was *Prince*: So as there needed no new Dedication of this *Worke*, but onely in all humbleness, to let your *Majesty* know, it is yours. It is true; if that *Lord* had lived, your *Majesty*, ere long, had beene invoked, to the Protection of another *History*; whereof, not *Natures Kingdome*, as in this, but these of your *Majesties*,

The Epistle Dedicatory.

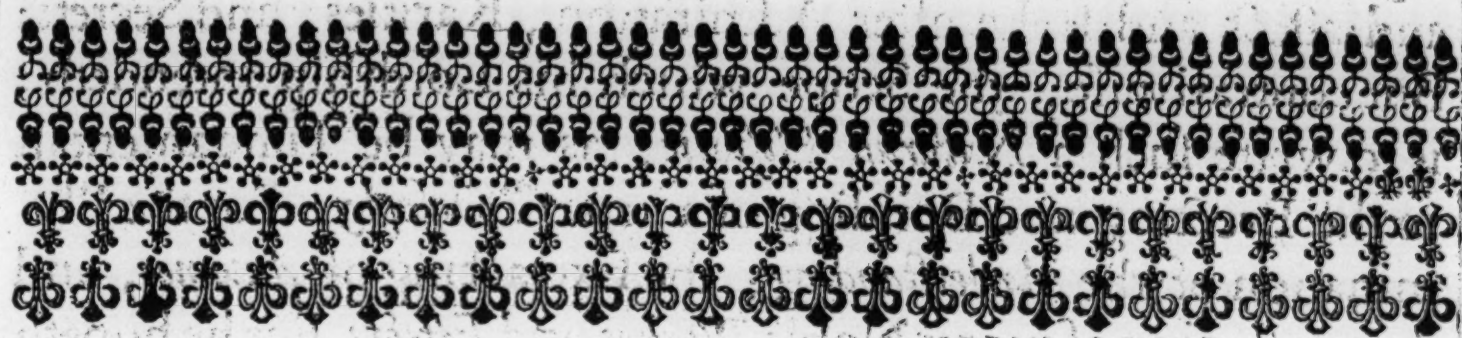
(during the Time and Raigne of King Henry the *Eighth*) had beene the Subject: Which since it died under the Designation meerely, there is nothing left, but your *Majesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a while, with his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlinesse to represent unto your *Majestie*, as one that was trusted with his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Majesties* Royall *Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenessse to approach your *Majesties* presence; And to offer it up into your *Sacred Hands*.

Your *MAJESTIES* most Loyall

and Devoted Subject,

W. RAVVLEY.

TO



To the Reader.

HAVING had the Honour to be continually with my Lord, in compiling of this *Worke*; And to be employed therein; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall read it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his own Name, he had been better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And he knew well, that there was no other way open to unloose Mens mindes, being bound; and (as it were) Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Sense, and cleare experience; But to keepe close to it, especially in the beginning: Besides, this *Naturall History* was a Debt of his, being designed and set down for a third part of the *Instauration*. I have also heard his Lordship discourse, that Men (no doubt) will think many of the *Experiments* contained in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitlesse: And therefore he wisheth, that they would have perpetually before their Eyes, what is now in doing: And the difference between this *Naturall Historie*, and others. For those *Naturall Histories*, which are Extant, being gathered for De-
light

To the Reader.

light and Use, are full of pleasant Descriptions and Pictures; and affect and seeke after Admiracion, Rarities, and Secrets. But contrariwise, the Scope which his Lordship intendeth, is to write such a *Naturall Historie*, as may be Fundamentall to the Erecting and Building of a true *Philosophy*: For the Illumination of the *Understanding*; the Extracting of *Axiomes*, and the producing of many Noble *Workes*, and *Effects*. For he hopeth by this meanes, to acquit himselfe of that, for which he taketh *Himselfe* in a sort bound; And that is the Advancement of all Learning and Sciences. For having in this present Work Collected the Materialls for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part) set down the Instruments and Directions for the Work; Men shall now be wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall Men is capable. And in this behalfe, I have heard his Lordship speake complainingly; That his Lordship (who thinketh that he deserveth to be an Architect in this building) should be forced to be a Work-man, and a Labourer; And to digge the Clay, and burn the Brick; And more then that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Basenesse* of many of the Experiments; As long as they be Gods Works, they are honourable enough. And for the *Vulgarnesse* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubtfull; And his Lordships course is to make Wonders Plaine, and not Plaine things Wonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for Use, his Lordship hath often in his Mouth, the two kindes, of *Experiments*, *Experimenta Frustrifera*, and *Experimenta Lucifera*: *Experiments of Use*, and *Experiments of Light*: And he reporteth himselfe, whether he were not a strange Man, that should think that Light hath no Use, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*, that in the succeeding work of *Interpreting Nature*, and *Framing Axiomes*, all things may be in more readinesse. And for the *Causes* herein by him assigned; his Lordship perswadeth Himselfe, they are farre more certaine, than those

To the Reader.

those that are rendred by Others; Not for any Excellency of his own Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. He did consider likewise, that by this addition of *Causes*, mens mindes (which make so much haste to finde out the *Causes* of things :) would not think themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a little, till true *Axiomes* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentively into them, shall finde that they have a secret Order) was because he conceived that other men would now think that they could do the like: And so go on with a further Collection: which if the *Method* had been Exact, many would have despaired to attain by Imitation. As for his Lordships love of Order, I can referre any Man to his Lordships Latine Book, *De Augmentis Scientiarum*: which (if my Judgement be any thing) is written in the Exactest Order, that I know any Writing to be. I will conclude with an usuall speech of his Lordships. That this Work of his *Naturall History*, is the *World*, as GOD made it, and not as Men have made it: For that it hath nothing of Imagination.

This Epistle
is the same,
that should
have been
prefixed to
this Book, if
his Lordship
had lived.

W. Rawley.

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NATVRALL HISTORIE.

I. Century.



Digge a *Pit* upon the *Sea-shore*, somewhat above the High-water Marke, and sinke it as deepe as the Low water Marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practised upon the Coast of *Barbary*, where other fresh *Water* is wanting. And *Cæsar* knew this well, when he was besieged in *Alexandria*: For by digging of *Pits* in the *Sea-shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-water* upon the Wells of *Alexandria*; And so saved his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For he thought that all *Sea-sands* had Naturall Springs of *Fresh Water*. But it is plaine, that it is the *Sea-water*; because the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Straining through the Sands, leaveth the Saltnesse.

I remember to have read, that Triall hath been made of *Salt-water* passed through *Earth*, through ten Vessels, one within another, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another) *Salt-water* drayned through twenty Vessels, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pits*, made by the *Sea-side*; and yet but in part, if it be true, that twenty Repetitions doe the effect. But it is worth the Note, how poore the Imitations of Nature are, in common course of *Experiments*, except they be led by great Judgement, and some good Light of *Axiomes*. For first, there is no small difference between a Passage of *Water* through twenty small Vessels; And through such a distance, as between the Low-water and High-water Mark. Secondly, there is a great difference between Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides, Earth doth not strain the Water so finely, as Sand doth. But there is a third Point, that I suspect as much, or more than the other Two; And that is, that in the *experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *Water* riseth; But in the *experiment* of transmission of the *Water* through the Vessels, it falleth: Now certain it is, that the Salter part of *Water*, (once

Experiments
in *Consort*, touching the Straining and Passing of Bodies, one through another: which they call *Percolation*.

1.

2.

Salted throughout) goeth to the Bottome. And therefore no marvaile, if the Drayning of *water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *water*, that commeth from the Sea, is more proper to strike off the Salt part, than where the *water* slideth of her owne Motion.

3. It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*) is a good kinde of *Separation*, Not onely of Thick from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a woollen Bag, the Liquor leaveth the Fatnesse; If through Sand, the Saltnesse, &c. They speak of Severing Wine from Water; passing it through Ivie wood, or through other the like porous Body; but *Nonconstat*.

4. The *Gum* of *Trees* (which we see to be commonly shining and cleare) is but a fine Passage or *straining* of the Juyce of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gums*) are the fine Exudations of *Stone*.

5. *Aristotle* giveth the Cause, vainly, why the *Feathers* of *Birds* are of more lively Colours, than the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Green *Haire*. He saith, it is, because *Birds* are more in the Beames of the Sun, than *Beasts*; but that is manifestly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the excrementitious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer & more delicate Strainer, than it doth in *Beasts*: For *Feathers* passe through Quills; And *Haire* through Skin,

6. The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquors*; whereby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarify their *Syrups* by whites of Eggs, beaten with the Juices which they would clarify; which whites of Eggs gather all the Dregs and grosser Parts of the Juice to them; And after the *Syrup* being set on the Fire, the whites of Eggs themselves harden, and are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about, And then passing it through a Woollen Bag, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milk draweth the Powder of the Spices, and grosser parts of the *Liquor* to it; and in the passage they stick upon the Woollen bag.

7. The *Clarifying* of *Water*, is an experiment tending to Health; besides the pleasure of the Eye, when *water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *water* may straine through them.

8. It may be, *percolation* doth not onely cause Cleannesse and Splendour, but Sweetnesse of Savour; For that also followeth, as well as Cleannesse, when the Finer Parts are severed from the Grosser. So it is found, that the Sweats of Men that have much Heat, and exercise much, and have cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gums* have sweet Odours.

Experiments
in *Confort* touching
Motion of
Bodies upon
their *Pressure*.

9.

TAke a *Glasse*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the *Glasse*, pressing it somewhat hard; And after you have drawn it some few times about, it will make the *Water* friske and

and sprinkle up, in a fine Dew. This *Instance* doth excellently Demonstrate the Force of *Compression* in a Solid Bodie. For whensoever a Solid Body (as Wood, Stone, Metall, &c.) is pressed, there is an inward Tumult in the parts thereof; seeking to deliver themselves from the Compression: And this is the Cause of all *Violent Motion*. Wherein it is strange in the highest Degree, that this *Motion* hath never been observed, nor inquired; It being of all *Motions*, the most Common, and the Chiefe Root of all *Mechanicall Operations*. This *Motion* worketh in round at first, by way of Proofs, and Search, which way to deliver it selfe; And then worketh in Progresse, where it findeth the Deliverance easiest. In *Liquors* this *Motion* is visible: For all Liquors stricken make round Circles, and withall Dash; but in *Solids*, (which break not) it is so subtile, as it is invisible; but nevertheless bewrayeth it selfe by many effects; as in this *Instance* whereof we speake. For the *Pressure* of the Finger furthered by the wetting (because it sticketh so much the better unto the Lip of the *Glasse*) after some continuance, putteth all the small Parts of the *Glasse* into worke; that they strike the *Water* sharply; from which *Percussion* that Sprinkling cometh.

If you strike or pierce a *Solid Body*, that is Brittle, as *Glasse*, or *Suger*, it breaketh not onely, where the immediate force is; but breaketh all about into shivers and fitters; The *Motion*, upon the *Pressure*, searching all wayes, and breaking where it findeth the *Body* weakest.

The *Powder* in *Shot* being Dilated into such a *Flame*, as endureth not *Compression*, Moveth likewise in round, (the *Flame* being in the Nature of a *liquid Body*;) Sometimes recoyling, Sometimes breaking the *Piece*; But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; we use to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, delivereth and restoreth it self to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloth* tentured spring back. These two *Motions* (of which there be infinite Instances) we shall handle in due place.

This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds*; As when one Chimeth upon a *Bell*, it soundeth; But as soone as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginal String*, as soone as the Quill of the Jack falleth from it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, upon the Aire; All one, as the *Water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, upon the *Water*, whereof we spake a little before in the ninth *Experiment*. For you must not take it to be, the locall shaking of the *Bell*, or *String* that doth it. As we shall fully declare, when we come hereafter to handle *Sounds*.

TAke a *Glasse* with a *Belly* and a long *Neb*; fill the *Belly* (in part) with *Water*: Take also another *Glasse*, whereinto put *Claret Wine* and *Water* mingled; Reverse the first *Glasse*, with the *Belly* upwards, Stopping the *Neb* with your finger; Then dip the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will unminge the *Wine* from the *Water*: The *Wine* ascending & setling in the top of the upper *Glasse*; And the *Water* descending and setling in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For

you shall see the *Wine*, as it were, in a small veine, rising through the *Water*. For handfomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soon as there is gathered so much pure and unmixed *Water* in the Bottom of the Lower *Glasse*, as that the Mouth of the Upper *Glasse* dippeth into it, the *Motion* ceaseth.

15.

Let the Upper *Glasse* be *Wine*, and the Lower *Water*; there followeth no *Motion* at all. Let the Upper *Glas* be *Water* pure, the Lower *Water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath been tried, that though the Mixture of *Wine* and *Water*, in the Lower *Glas*, be three parts *Water*, and but one *Wine*; yet it doth not dead the *Motion*. This *Separation* of *Water* & *Wine* appeareth to be made by *Weight*; for it must be of *Bodies* of unequall *Weight*, or else it worketh not; And the Heavier *Body* must ever be in the upper *Glas*. But then note withall, that the *Water* being made pensile, and there being a great *Weight* of *Water* in the *Belly* of the *Glas*, sustained by a small Pillar of *Water* in the Neck of the *Glas*; It is that, which setteth the *Motion* on worke: For *Water* and *Wine* in one *Glas*, with long standing, will hardly sever.

16.

This *Experiment* would be Extended from Mixtures of severall *Liquors*, to *Simple Bodies*, which Consist of severall Similar Parts: Try it therefore with *Broyn* or *Salt-water*, and *Fresh-water*: Placing the *Salt-water* (which is the heavier) in the upper *Glas*; And see whether the *Fresh* will come above. Trie it also with *Water thick Sugred*, and *Pure Water*; and see whether the *Water* which cometh above, will lose his Sweetnesse: For which purpose it were good there were a little Cock made in the Belly of the upper *Glasse*.

Experiments
in Confort
touching Indi-
cious and Accu-
rate Infusions,
both in *Liquors*,
and *Aire*.

17.

IN *Bodies* containing Fine Spirits, which doe easily dissipate, when you make *Infusions*, the Rule is; A short Stay of the *Body* in the *Liquor* receiveth the Spirit; And a longer Stay confoundeth it; because it draweth forth the Earthy Part withall; which embaseth the finer. And therefore it is an Errour in *Physitians*, to rest simply upon the Length of stay, for increasing the vertue. But if you will have the *Infusion* strong, in those kind of *Bodies* which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infusion* of the *Body* oftner. Take *Violets*, and infuse a good Pugill of them in a Quart of Vineger; Let them stay three quarters of an houre, and take them forth; And refresh the *Infusion* with like quantity of new *Violets*, seven times; And it will make a Vineger so fresh of the *Flower*, as if a Twelve month after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, than at first.

18.

This Rule, which we have given, is of singular use, for the Preparations of *Medicines*, and other *Infusions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnesse: But neverthelesse, if the Leafe be infused long, it yeildeth forth but a raw substance, of no Vertue: Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh; It will make a Sovereigne Drinke for Melancholy Passions. And the like I conceive of *Orenge Flowers*.

19.

Rubarb hath manifestly in it Parts of contrary Operations: Parts that purge, and parts that bind the body: and the first lay looser, and the latter lay deeper:

deeper: So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and bind the Body lesse after the purging, than if it stood twenty foure houres; This is tried: But I conceive likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of Violets) letting each stay in but a small time; you may make it as strong a *Purging Medicine*, as *Scammony*. And it is not a small thing won in *Physick*, if you can make *Rubarb*, and other *Medicines* that are *Benedict*, as strong Purgers, as those that are not without some Malignity.

Purging Medicines, for the most part, have their *Purgative* Vertue, in a fine Spirit; As appeareth by that they endure not boyling, without much losse of vertue. And therefore it is of good use in *Physick*, if you can retaine the *Purging* Vertue, and take away the Unpleasant taste of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Grosser part.

Generally, the working by *Infusions*, is grosse and blinde, except you first trie the Issuing of the severall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leave that Quality, which you desire. This to know, there be two wayes; The one to trie what long stay, and what short stay worketh, as hath been said: The other to trie in Order, the succeeding *Infusions*, of one and the same Body, successively, in severall *Liquors*. As for example; Take *Orange-Pils*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*: Then take them out; and *Infuse* them againe in other *Water*; And so the third time: And then tast and consider the *First Water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknesse, but otherwise in Tast, or Odour; For it may be the *First water* will have more of the Sent, as more Fragrant; And the *Second* more of the Tast, as more bitter or Biting, &c.

Infusions in *Aire*, (for so we may well call *Odours*) have the same diversities with *Infusions* in *Water*; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times; Some earlier, some later: So we find that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Sent, that cometh forth first; But soone after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Grosser Spirit.

As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *VVine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poysonous Quality, if it be vapoured out, mingled with *Spirit* of *VVine*, or the like: *Sean* leeseeth somewhat of his windiness by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better powre off the first *Infusion*, after a small time, and use the latter.

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *VVater* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *VVater*; And when it cometh to the top, should be stayed by so weake a Cover as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is under the *VVater*, that is a Motion of Percussion from the *VVater*; which it selfe descending, driveth up the *Aire*; and no Motion of Levity in the *Aire*. And this *Democritus*

20.

21.

22.

23.

Experiment Solitary, touching the Appetite of Continuation in Liquids.

24.

called *Motus Plage*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solid *Bodies* is strong) is also in *Liquors*, though fainter and weaker; As we see in this of the *Bubble*: we see it also in little Glasses of Spittle that Children make of Rushes; And in Castles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soap: We see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, wil Draw themselves into a small thred, because they will not discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundnesse of the *Bubble*, as well for the Skin of *Water*, as for the *Aire* within: For the *Aire* likewise avoideth *Discontinuance*; And therefore casteth it selfe into a round Figure. And for the stop and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

Experiment
Solitary, touching the making of *Artificiall Springs*.

25.

THE Rejection, which I continually use, of *Experiments*, (though it appeareth not) is infinite; But yet if an *Experiment* be probable in the Work, and of great Use, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Find out a hanging Ground, where there is a good quick Fall of Rain-water. Lay a Half-Trough of Stone, of a good length, three or foure foot deep within the same Ground; with one end upon the high Ground, the other upon the low: Cover the Trough with Brakes a good thicknesse, and cast Sand upon the Top of the Brakes: You shall see, (saith he) that after some showres are past, the lower end of the Trough will run like a *Spring* of *water*: which is no marvaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it self upon the *Aire*, by the help of the Coldnesse and Condensation of the Earth, and the Confort of the first Water.

Experiment
Solitary, touching the *Venomous Quality* of *Mans Flesh*.

26.

THE *French*, (which put off the Name of the *French Disease*, unto the Name of the *Disease of Naples*) doe report, that at the Siege of *Naples*, there were certain wicked Merchants that Barrelled up *Mans flesh*, (of some that had been lately slain in *Barbary*) and sold it for *Tunney*; And that upon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certain, that the *Caniballs* in the *West Indies*, eat *Mans flesh*; And the *West Indies* were full of the Pocks when they were first discovered: And at this day the *Mortalest* *poysons*, practised by the *West Indians*, have some Mixture of the Blood, or Fat, or Flesh of *Man*: And divers Witches, and Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fed upon *Mans flesh*, to aid (as it seemeth) their Imagination, with high and foule Vapours.

Experiment
Solitary, touching the *Version* and *Transmutation* of *Aire* into *Water*.

27.

IT seemeth that there be these wayes (in likelyhood) of *Version* of *Vapours* or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly Condense; as we see in the *Contracting* of the *Aire* in the *Weather-Glasse*; whereby it is a Degree nearer to *Water*. We see it also in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *Water*, holpen by the *Rest*, which the *Aire* hath in those Parts; whereby it cannot dissipate. And by the *Coldnesse* of *Rocks*; for there

there *Springs* are chiefly generated. We see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dewes*, and *Raines*. And the Experiment of Turning *Water* into *Ice*, by *Snow*, *Nitre*, and *Salt*, (whereof we shall speak hereafter) would be transferred to the Turning of *Aire* into *Water*. The Second way is by *Compression*; As in *Stillatories*, where the Vapour is turned back, upon it self, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*. And in the *Dew* towards *Raine*, upon *Marble*, and *Wainscot*. But this is like to doe no great effect; Except it be upon Vapours, and grosse *Aire*, that are already very neer in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of moist *Vapours* with *Aire*; And trying if they will not bring a Returne of more *water*, than the *Water* was at first: For if so; That Increase is a *Version* of the *Aire*: Therefore put *Water* into the Bottom of a *Stillatory*, with the *Neb* stopped; Weigh the *Water* first; Hang in the Middle of the *Stillatory* a large *Sponge*; And see what Quantity of *Water* you can crush out of it; And what it is more, or less, compared with the *Water* spent; for you must understand, that if any *Version* can be wrought, it will be easiest done in small Pores: And that is the Reason why we prescribe a *Sponge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiving* the *Aire* into the small Pores of *Bodies*; For (as hath been said) every thing in small Quantity is more easie for *version*; And Tangible Bodies have no pleasure in the comfort of *Aire*, but endeavour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should Condense, there is nothing to succeed: Therefore it must be in *loose Bodies*, as *Sand*, and *Powder*; which we see, if they lie close, of themselves gather Moisture.

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put young, into such a Cage, or Box, as they cannot rise to their Stature, but may increase in Breadth, or Length, will grow accordingly, as they can get Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightned, doth not thereupon die; It is a Means to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of *Creatures*, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macrocephali*; which shape of the Head, at that time, was esteemed. And the Raifing gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which observation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kinds, more comely, and better featured, than otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Legs, to keep them from falling down too low; And by Stroaking up the Forehead to keep them from being low-foreheaded. And it is a common Practice to swathe Infants, that they may grow more straight, and better shaped: And we see Young Women, by wearing straight Bodies, keep themselves from being Grosse and Corpulent.

ONions, as they hang, will many of them shoot forth; and so will *Pennirovall*; and so will an Herbe called *Orpin*; with which they use, in the Countrey, to trim their Houses, binding it to a Lath, or Strick, and setting it against a wall. We see it likewise, more especially, in the greater

Semper-

Experiment
Solitary, touching
Helps towards the
Beauty & good Fea-
tures of Persons.
28.

Experiment
Solitary, touch-
ing the Con-
densing of Aire
in such sort as
it may put on
weight, & yeild
Nourishment.
29.

Semper-vive, which will put out Branches, two or three yeares : But it is true, that commonly they wrap the Root in a Cloth besmeared with *Oyle*, and renue it once in half a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is ; For that these *Plants* have a Strong, Dense, and Succulent Moisture, which is not apt to exhale ; And so is able, from the old store, without drawing help from the Earth, to suffice the sprouting of the *Plant* : And this Sprouting is chiefly in the late Spring, or early Sommer ; which are the Times of Putting forth. We see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to trie whether these things, in the Sprouting, doe increase *Weight* ; which must be tried, by weighing them before they be hang'd up ; And afterwards againe, when they are sprouted. For if they increase not in *Weight* ; Then it is no more but this ; That what they send forth in the Sprout, they leese in some other Part : But if they gather *Weight*, then it is *Magnale Natura* ; For it sheweth that *Aire* may be made so to be Condensed, as to be converted into a *Dense Body* ; whereas the Race and Period of all things, here above the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare ; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also that *Aire* can *Nourish* ; which is another great Matter of Consequence. Note, that to trie this, the *Experiment* of the *Semper-vive*, must be made without Oyling the Cloth ; For else, it may be, the *Plant* receiveth Nourishment from the *Oyle*.

Experiment
Solitary, touching the
Mixture of
Flame & Aire,
and the great
Force thereof.

30.

Flame and *Aire* doe not Mingle, except it be in an *Instant* ; Or in the *Vitall Spirits* of *Vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame* ; And thus farre it is true : And then (forsooth) it is become another Element ; the Forme whereof occupieth more place ; And so, of Necessity, followeth a Dilatation : And therefore, lest two Bodies should be in one place, there must needs also follow an Expulsion of the Pellet ; Or blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing else, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is ; Or the Barrell of a Gun ; So as the *Flame* would not expell the hard Body ; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which we call otherwise *Salt-Petre*) which having in it a notable Crude and windy *Spirit*, first by the *Heat* of the *Fire* suddenly dilateth it selfe ; (and we know that simple *Aire*, being preternaturally attenuated by *Heat*, will make it self Roome, and break, and blow up that which resisteth it.) And secondly, when the *Nitre* hath dilated it self, it bloweth abroad the *Flame*, as an inward Bellows. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wild-fire*, and divers other Inflammable Matters, though they burn cruelly, and are hard to quench, Yet they make no such fiery wind, as *Gunpowder* doth : And on the other side, we see that *Quick-silver*, (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certain, their *Vitall Spirits* are a Substance Compounded of an *Airy & Flamy* Matter ; And though *Aire & Flame* being free, will not well mingle ; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*) *Water*, and *Oyle* ; For they likewise will not well mingle of themselves, but in the Bodies of *Plants*,
and

and *Living Creatures*, they will. It is no marvaile therefore, that a small *Quantity of Spirits*, in the Cels of the Braine, and Cannals of the Sinewes, are able to move the whole Body, (which is of so great Masse) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnesse, as in playing Division upon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame* when they incorporate.

TAKE a small *Wax Candle*, and put it in a Socket, of Brasse, or Iron; Then set it upright in a Porringer full of *Spirit of Wine*, heated: Then set both the *Candle*, and *Spirit of Wine*, on fire, and you shal see the *Flame* of the *Candle*, open it selfe, and become foure or five times bigger than otherwise it would have been; and appeare in Figure *Globular*, and not in *Pyramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not wax any whit blew towards the Colour of the Outward *Flame* of the *Spirit of Wine*. This is a Noble *Instance*, wherein two things are most remarkable, The one, that one *Flame* within another quencheth not, but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnes, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottom, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but onely remaineth contiguous; As it cometh to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Pyramis* in *Flame*, which we usually see, is meerly by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoak* is in the Figure of a *Pyramis* Reversed; For the *aire* quencheth the *Flame*, and receiveth the *Smoak*. Note also, that the *Flame* of the *Candle* within the *Flame* of the *Spirit of Wine*, is troubled; And doth not only open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched) would rowle and turne, as well as move upwards. By all which it should seem, that the Coelestiall Bodies, (most of them) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all *Globular*, and Determinate, They have Rotation, And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Consistent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment
Solitary, touching the Secret Nature of
Flame.

31.

TAKE an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it cometh forth, you shall find those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, & turned almost into a Coale; whereas that in the Midst of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the Midst: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked & pent. And therefore the *Peripateticks* (howsoever their opinion of an *Element* of *Fire* above the *Aire* is justly exploded) in that Point they acquit themselves well: For being opposed, that if there were a *Sphere* of *Fire*, that incompassed the Earth so neare hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment
Solitary, touching the Different force of
Flame in the Midst and on the
Sides.

32.

It

Experiment
Solitary, tou-
ching the De-
crease of the
Naturall motion
of Gravity in
great distance
from the Earth ;
or within some
depth of the
Earth.

33.

Experiment
Solitary, tou-
ching the Con-
traction of Bo-
dies in Bulk, by
the Mixture of
the more Liquid
Body with the
more Solid.

34.

Experiment
Solitary, tou-
ching the Ma-
king Vines more
fruitfull.

35.

Experiments
in Confort
touching Pur-
ging Medicines.

36.

IT is affirmed constantly by many, as an usuall Experiment, That a *Lump* of *Vre*, in the *Bottome* of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the *Top* of the Earth, will aske six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tryed to the full: For it is very probable, that the *Motion of Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull: The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancients*) it is a meer Vanity.

IT is strange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently, is, That a *Vessel* filled with *Ashes*, will receive the like quantity of *Water*, that it would have done, if it had been empty. But this is utterly untrue, for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As we see that *Ashes* alone, if they be hard pressed, will lie in lesse room: And so the *Ashes* with *Aire* between, lie looser; and with *Water*, closer. For I have not yet found certainly, that the *Water*, it self, by mixture of *Ashes*, or *Dust*, will shrink or draw into lesse Roome.

IT is reported of credit, that if you lay good store of *Kernels* of *Grapes*, about the *Root* of a *Vine*, it will make the *Vine* come earlier and prosper better. It may be tryed with other *Kernels*, laid about the *Root* of a *Plant* of the same kind; As *Figgs*, *Kernels* of *Apples*, &c. The Cause may be, for that the *Kernels* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and devoureth the Nourishment, when they have drawne it: As great *Fishes* devoure little.

THE Operation of *Purging Medicines*, and the Causes thereof, have been thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall Vertue*, and a *Fourth Quality*, and the like Shifts of Ignorance. The Causes of *Purging* are divers; all plaine and perspicuous, and thoroughly maintained by Experience. The first is, That whatsoever cannot be overcome and digested by the *Stomack*, is by the *Stomack*, either put up by *Vomit*, or put downe to the *Guts*; And by that *Motion of Expulsion* in the *Stomack*, and *Guts*, other *Parts of the Body* (as the *Orifices* of the *Veins*, and the like) are moved to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomack*, is caused either by the *Quality* of the *Medicine*, or by the *Quantity*. The *Qualities* are three: *Extreme Bitter*, as in *Aloes*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Body*, many times not appearing much in the Taste; As in *Scamony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine* that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to be held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*, or by a *secret Malignity*, & Enmity to *Nature*: And therefore such *Medicines* are warily to be prepared, and used. The *Quantity* of that which is taken, doth also cause *Purging*; As we see in a great *Quantity* of *New Milke* from the Cow; yea and a great *Quantity* of *Meat*; For

Surfeits

Surfets many times turne to *Purges*, both upwards, and downwards. Therefore we see generally, that the working of *Purging Medicines* cometh two or three houres after the *Medicines* taken; For that the *Stomack* first maketh a proof, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great quantity.

A second Cause is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seen, that *Salt*, or any such thing that is sharp and biting, put into the *Fundament*, doth provoke the part to expell; And *Mustard* provoketh Sneezing: And any sharp Thing to the *Eyes* provoketh Tears. And therefore we see that almost all *Purgers* have a kind of *Twiching* and *vellication*, besides the *gripping* which cometh of winde. And if this *mordication* be in an over-high Degree, it is little better than the *corrosion* of *payson*; And it cometh to passe sometimes in *Antimony*; Especially if it be given to bodies not repleat with *Humours*; for where *Humours* abound, the *Humours* save the *Parts*.

The third Cause is *Attraction*: For I doe not deny but that *purging Medicines* have in them a direct Force of *Attraction*, As *Drawing Plasters* have in *Surgery*: And we see *Sage*, or *Betony bruised*, *sneezing-powder*, and other *powders* or *Liquors* (which the *Physicians* call *Errhines*) put into the *Nose*, draw *Flegme*, and water from the *Head*; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the *Rheume* down by the *Palat*. And by this *Virtue*, no doubt, some *Purgers* draw more one *Humour*, and some another, according to the opinion received: As *Rubarb* draweth *Choler*; *Sean Melancholy*; *Agarick Flegme*, &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides *Sympathy*, between the *Purger* & the *Humour*, there is also another Cause, why some *Medicines* draw some *Humour* more than another. And it is, for that some *Medicines* worke quicker than others: And they that draw quick, draw onely the *Lighter*, and more *finde* *Humours*; they that draw slow, work upon the more *Tough*, and *Viscous* *Humours*. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh onely the *Lightest* part of the *Humour* away, and leaveth the *Mass* of *Humours* more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth Cause is *Flatuositie*: For wind stirred moveth to expell: And we finde that (in effect) all *Purgers* have in them a raw *Spinit*, or *Winde*; which is the principall Cause of *Tortion* in the *Stomack*, & *Belly*. And therefore *Purgers* leese (most of them) the vertue, by *Decoction* upon the *Fire*; And for that Cause are given chiefly in *Infusion*, *Juyce*, or *Powder*.

The fifth Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *sponge*: So we see that *Taking Cold* moveth loosnesse by *Contraction* of the *skin*, and outward *Parts*; And so doth *Cold* likewise cause *Rheumes*, and *Defluxions* from the *Head*; And some *Astringent Plasters* crush out *purulent Matter*. This kinde of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may be the *Barkes of Peaches*; For this *Virtue* requireth an *Astriction*; But such an *Astriction*, as is not gratefull to the *Body* (For a pleasing *Astriction* doth rather *Binde* in the *Humours*, than *Expell* them:) And therefore such *Astriction* is found in Things of an *Harsh Taste*.

The Sixt Cause is *Lubrefaction*, and *Relaxation*: As we see in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallows*, *Eetnae*, *Mercuriall*, *Pellitory of the Wall*, and others. There is also a seeret vertue of *relaxation* in *Cold*: For the heat of the *Body* bindeth the *Parts* and *Humours* together, which Cold,

37.

38.

39.

40.

41.

Cold, relaxeth : As it is seen in *Vrine*, *Bloud*, *Pottage*, or the like ; which, if they be *Cold*, Breake, and dissolve. And by this kind of *Relaxation*, *Feare* looseth the Belly ; because the Heat retiring inwards towards the Heart, the Guts and other Parts are relaxed ; In the same manner as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42. The Seventh Cause is *Absterfion* ; which is plainly a *Scouring off*, or *Incision* of the more viscus *Humors*, and making the *Humours* more fluide ; And Cutting between them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulness. But this *Incision* must be by a *Sharpnesse*, without *Astriction* : which we finde in *Salt*, *Wormwood*, *Oxymel*, and the like.

43. There be *Medicines*, that move *Stooles*, and not *Vrine* ; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stool*, are such as enter not at all, or little into the *Mesentery veines* ; But either at the first are not digestible by the *Stomack*, and therefore move immediately downwards to the *Guts* ; Or else are afterwards rejected by the *Mesentery Veines*, and so turne likewise downwards to the *Guts* ; and of these two kinds are most *Purgers*. But those that move *Vrine*, are such as are well digested of the *Stomack*, and well received also of the *Mesentery veines* ; so they come as far as the *Liver*, which sendeth *Vrine* to the *Bladder*, as the *Whey of Bloud* : And those *Medicines* being Opening and Piercing, do fortifie the Operation of the *Liver*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigestion, as *Solutive* doe.

44. There be divers *Medicines*, which in greater *Quantity*, move *Stooles*, and in smaller, *Vrine* : And so contrariwise, some that in greater *Quantity*, move *Vrine*, and in smaller, *Stooles*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomack* in a small *Quantity* doth digest, and overcome, (being not Flatuous, nor Loathsome,) and so sendeth it to the *Mesentery veines* ; And so being opening, it helpeth downe *Vrine* : But in a greater *Quantity*, the *Stomack* cannot overcome it, and so it goeth to the *Guts*. *Pepper* by some of the *Ancients* is noted to be of the second sort ; which being in small *Quantity*, moveth winde in the *Stomack* or *Guts*, and so expelled by *Stool* ; But being in greater *Quantity*, dissipateth the *Wind* ; And it selfe getteth to the *Mesentery veines* ; And so to the *Liver*, and *Reines* ; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments
in consort tou-
ching Meats &
Drinks that are
most nourishing.

45.

WE have spoken of *Evacuating* of the *Body*, we will now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one part that is more Nourishing than another ; As *Graines* and *Roots* nourish more, than the *Leaves* ; in so much as the *Order* of the *Foliatanes* was put down by the *Pope*, as finding *Leaves* unable to Nourish Mans Body. Whether there be that difference in the *Flesh* of *Living Creatures*, is not well inquired : As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great delicacy ; In so much as they had Artificiall means to make it faire, and great ; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some *Decoction* of *Bones*, and *Sinewes*, stamped, and well strained, would be a very *Nourishing Broth* : Wee finde also that *Scotch Skinck* ; (which is a *Pottage* of strong Nourishment) is made

made with the *Knees*, and *Sinews* of *Beef*, but long-boiled: *Felly* also, which they use for a Restorative, is chiefly made of *Knuuckles* of *Veale*. The *Fulp* that is within the *Crasfish* or *Crab*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crab*, or *Crasfish*. The *Tolkes* of *Eggs* are clearly more Nourishing than the *Whites*. So that it should seem, that the Parts of *Living Creatures*, that lie more Inwards, nourish more than the Outward *Flesh*: Except it be the *Braine*; which the Spirits prey too much upon, to leave it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should be Devised, as should be half *Chylus*, before it be put into the Stomach.

Take two large *Capons*; perboyle them upon a soft fire, by the space of an houre, or more, till in effect all the Blood be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanks*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of foure Gallons of Beere, of 8, s. strength, new as it cometh from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steep in it three Dayes, and three Nights, the Bung hole open, to worke; Then close the Bung hole, and so let it continue, a Day and a halfe; Then draw it into bottles, and you may drink it well after 3 daies Botteling; And it will last six weeks (approved) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newish at all; It is an excellent Drinke for a Consumption, to be drunke either alone, or Carded with some other Beere. It quencheth Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drinke, as is used, should get forth into the veines, and outward Parts, so finely, and easily, as when it is thus Incorporate, and made almost a *Chylus* aforehand.

Triall would be made of the like Brew with *Potado Roots*, or *Burr Roots*, or the *Pith* of *Artichoaks*, which are nourishing Meats: It may be tryed also, with other flesh; As *Phesant*, *Partridge*, *Young Parke*, *Pigge*, *Venison*, especially of young *Deere*, &c.

A *Mortresse* made with the *Brawne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantity, (at the least) of *Almond Butter*; is an excellent Meat to nourish those that are weake; Better than *Blanck-Manger*, or *Felley*: And so is the *Callice* of *Cocks*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Callice*, of it self, is more Savory and strong; And not so fit for Nourishing of weak Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

Indian Maiz hath (of certaine) an excellent Spirit of Nourishment; But it must be thoroughly boyled, and made into a *Maiz-Cream* like a *Barley-Cream*. I judge the same of *Rize*, made into a Cream, For *Rize* is in *Turky*, and other Countries of the East, most fed upon; But it must be thoroughly boyled in respect of the Hardnesse of it: And also because otherwise it bindeth the body too much.

Pistachoes, so they be good, and not musty, joyned with *Almonds* in *Almond Milk*; Or made into a *Milk* of themselves, like unto *Almond Milk*, but more green, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtil windinesse.

46.

47.

48.

49.

50.

51.

Milke warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions* : But then you must put into it, when you Milke the Cow, two little bags ; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses* ; For they keep the *Milke* somewhat from Turning, or Crudling in the Stomach : And put in Sugar also, for the same cause, and partly for the Tasts sake ; But you must drinke a good draught, that it may stay lesse time in the Stomach, lest it Cruddle : And let the Cup into which you milke the Cow, be set in a greater Cup of hot water, that you may take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of Urine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans mi'lke* likewise is prescribed, when all faile ; but I commend it not, as being a little too neare the Juyce of Mans Body, to be a good Nourisher ; Except it be in *Infants*, to whom it is Naturall.

52.

Oyle of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, spread upon Bread toasted, is an Excellent Nourisher ; But then to keep the *Oyle* from frying in the Stomach, you must drinke a good draught of Milde Beere after it ; And to keep it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

53.

The *Yolkes* of *Egges* are of themselves so well prepared by Nature for Nourishment ; As (so they be Potched, or Reare boyled) they need no other Preparation, or Mixture ; yet they may be taken also raw, when they are new laid, with *Malmesey*, or *Sweet Wine* ; You shall doe well to put in some few Slices of *Eringium Roots*, and a little *Amber-grice* ; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Back ; so that it will not draw downe the *Vrine* too fast, For too much *Vrine* doth alwayes hinder Nourishment.

54.

Mincing of *Meat*, as in *Pies*, and *Buttered Minced Meat*, saveth the Grinding of the Teeth ; And therefore, (no doubt) it is more Nourishing ; Especially in Age ; Or to them that have weake Teeth ; But the Butter is not so proper for weake Bodies ; And therefore it were good to moisten it with a little *Claret Wine*, Pill of *Limon*, or *Orenge*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmeg*. As for *Chuetts*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke* ; or *Barley*, or *Maiz Greame* ; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reserve to the due place.

We have hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment ; And now we will speake of the best Meanes of Conveying, and Converting the Nourishment.

55.

The First *Meanes* is, to procure that the *Nourishment* may not be robbed, and drawne away ; wherein that, which we have already said, is very Materiall ; To provide, that the *Reines* draw not too strongly an over-great Part of the *Blood* into *Vrine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions* ; For that the *Spirits* of the *Wine*, doe prey upon the Roscide Juyce of the Body, and inter-common with the *Spirits* of the Body, and so deceive & rob them of their Nourishment. And therefore if the *Consumption* growing from the weaknesse of the Stomach, doe force you to use *Wine*, let it alwaies be burnt, that the Quicker *Spirits* may evaporate ; or at the least quenched with two little wedges of Gold, 6 or 7 times repeated. Adde also this Provision, that there be not too much *Expence* of

of the *Nourishment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to be followed, who adviseth quite contrary to that which is in use: Namely, that the *Linnen*, or *Garment* next the *Flesh*, be in Winter drie, and oft changed; And in Summer seldome changed, and smeared over with *Oyle*; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyle of Sweet Almonds*; And not to forbear shifting as oft as is fit.

The Second *Meanes* is to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *VVine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath been tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *VVormwood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomach*: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a piece of flesh, or a Flower, that is laid in it: And therefore a *Bag* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lie long.

The Third *Meanes* (which may be a branch of the former) is to send forth the *Nourishment* the better by *Sleep*. For we see, that Beares, and other *Creatures* that sleep in the Winter, wax exceeding fat: And certaine it is, (as it is commonly believed) that *Sleep* doth Nourish much; Both for that the *Spirits* doe lesse spend the *Nourishment* in *Sleep*, than when living *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the *Nourishment* into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with *Choler*, a short *Sleep* after dinner doth help to Nourish; For in such Bodies there is no feare of an over-hasty Digestion, which is the Inconvenience of Postmeridian *Sleeps*. *Sleep* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would be done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the *Stomach*.

The Fourth *Meanes* is to provide that the *Parts* themselves may draw to them the *Nourishment* strongly. There is an excellent Observation of *Aristotle*; That a great reason, why *Plants* (some of them) are of greater Age, than *Living Creatures*, is, for that they yearly put forth new *Leaves*, and *Boughs*; whereas *Living Creatures* put forth (after their Period of Growth) nothing that is young, but *Haire* and *Nailles*, which are *Excrements*, and no *Parts*. And it is most certaine, that whatsoever is young, doth draw *Nourishment* better, than that which is Old; And then (that which is the Myserie of that Observation) young *Boughes*, and *Leaves*, calling the Sap up to them; the same Nourisheth the *Body*, in the Passage. And this we see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transfere therefore this Observation to the Helping of *Nourishment* in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation* of *Life*; *Restuuration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certain it is, that there are in *Living Creatures* *Parts* that Nourish, and Repaire easily; And *Parts* that

Nourish and repaire hardly ; And you must refresh, and renew those that are easie to Nourish, that the other may be refreshed, and (as it were) Drink in Nourishment, in the Passage. Now we see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beef; And Men after long Emaciating Diets, wax plump, and fat, and almost new : So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings* ; And perhaps of some kinde of *Bleeding* ; is a principall Means of *Prolongation of life*, & *Restoring* some Degree of *Youth*: For as we have often said, *Death* cometh upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,

Componens Manibusque Manus, atque Oribus Ora.

For the Parts in Mans Body easily reparable, (as *Spirits*, *Blood*, and *Flesh*) die in the Embrace of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*) And likewise some *Entrails* (which they reckon amongst the *Spermatall Parts*) are hard to repaire : Though that Division of *Spermatall*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies : And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them ; whereby they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the *Hand*, or a piece of *Scarlet-wool*, wet a little with *Oyle of Almonds*, mingled with a small Quantity of *Bay-salt*, or *Saffron* ; We see that the very Currying of Horses doth make them fat, and in good liking.

59.

The fifth *Meane* is, to further the very *Act*, of *Assimilation* of *Nourishment*, which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The use of it would be between Sleeps ; For in the latter Sleep the Parts *Assimilate* chiefly.

Experiment
Solitary, touch-
ing *Filum*
Medicinale.

60.

There be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt, but being applyed in a certaine Order, one after another, doe great Cures. I have tryed (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driven it away in 24 Houres space : It is first to apply a *Pultasse*, Of which *vide* the *Receit*. And then a *Bath* or *Fomentation*, of which *vide* the *Receit*; And then a *Plaster*, *vide* the *Receit*. The *Pultasse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours ; But yet in regard of the way made by the *Pultasse*, Draweth gently ; And therefore draweth the Humours out ; and doth not draw more to it ; For it is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefactive*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake ; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little ; If too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to be laid to, for two or three Houres : The *Fomentation* for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated : The *Plaster* to continue on still, till the Part be well confirmed.

There

There is a secret Way of Cure, (unpractized) By *Assuetude* of that which in it self hurteth. *Poysons* have been made, by some, Familiar, as hath been said. *Ordinary Keepers* of the Sick of the *Plague*, are seldome infected. *Enduring* of *Tortures*, by *Custom*, hath been made more easie: The *Brooking* of *Enormous Quantity* of *Meats*, and so of *Wine* or *Strong Drink*, hath been, by *Custom*, made to be without *Surfeit*, or *Drunkenness*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthicks*, some kinds of *Palseys*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be *Incurable*; Or whether the *Iust Cure* of it be not full of perill; And if he find it to be such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himself too much with the perfect *Cure*: And many times, (if the *Patient* be indeed patient) that *Course* will exceed all *Expectation*. Likewise the *Patient* himself may strive, by little and little, to *Overcome* the *Symptome*, in the *Exacerbation*, and so, by time, turne *Suffering* into *Nature*.

Experiment
Solitary, touching
Cure by
Custom.

61.

Divers *Diseases*, especially *Chronicall*, (such as *Quartain Agues*) are sometimes cured by *Surfeit*, and *Excesses*: As *Excesse* of *Meat*, *Excesse* of *Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lasitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an *Adventitious* *Strength* from *Custom*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custom* doth leave them onely to their first Cause; which if it be any thing weak will fall off. Besides, such *Excesses* doe *Excite* and *Spur Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary, touching
Cure by
Excesse.

62.

There is in the Body of Man a great *Consent* in the *Motion* of the severall *Parts*. We see, it is *Childrens* sport, to prove whether they can rub upon their *Brest* with one hand, and pat upon their *Fore-head* with another; And straight waies they shall sometimes rub with both hands, or pat with both hands. We see, that when the *Spirits*, that come to the *Nostrils*, expell a bad *Sent*, the *Stomach* is ready to *Expell* by *Vomit*. We finde that in *Consumptions* of the *Lungs*, when *Nature* cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they die. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosness*, and that is commonly *Mortall*. Therefore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment
Solitary, touching
Cure by
Motion of
Consent.

63.

Hippocrates Aphorisme, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sex*, *Season of the yeare*, *Diet*, &c. are more dangerous than those that are *Concurrent*. A Man would think it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that which maketh good the *Aphorisme*, is, Because such *Diseases* doe shew a greater *Collection* of *Matter*, by that they are able to overcome those *Naturall Inclinations* to the *Contrary*. And therefore in *Diseases* of that kinde, let the *Physitian* apply himself more to *Purgation*, than to *Alteration*; Because the offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment
Solitary, touching
Cure of
Diseases which
are contrary to
Predisposition.

64.

Experiment
Solitary, tou-
ching *Prepara-*
tions before
Purging, and
settling of the
Body after-
ward.

65.

Physicians doe wisely prescribe, that there be *Preparatives* used before *Purging*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not coming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently; Therefore the work of *Preparation* is double; to make the *Humours* *fluide*, and mature; And to make the *Passages* more open: For both those help to make the Humours passe readily. And for the former of these, *Syrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broths*; *Clysters* also help lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies* abounding with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physician* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in ill *Places*: For it is certain, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other *Places*, (especially *Passages*) doe much mischief. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Absterfive* and *Mundifying Clysters* also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region* of the *Body*.

Experiment
Solitary, tou-
ching *Stanch-*
ing of *Blood*.

66.

Blood is stanch'd divers wayes: First by *Astringents*, and *Repercussive Medicines*. Secondly, by *Drawing* of the *Spirits* and *Blood* inwards; which is done by *cold*; As *Iron* or a *Stone* laid to the Neck doth stanch the Bleeding at the Nose; also it hath been tryed, that the *Testicles* being put into sharp *Vinoger*, hath made a sudden *Recess* of the *Spirits*, and stanch'd *Blood*. Thirdly, by the *Recess* of the blood by *Sympathy*. So it hath been tryed, that the part that bleedeth, being thrust into the Body of a *Capon*, *Sheep*, new ript and bleeding, hath stanch'd *Blood*; The *Blood*, as it seemeth, sucking and drawing up, by similitude of substance, the *Blood* it meeteth with, and so it self going back. Fourthly, by *Custom* and *Time*; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could find no means to stanch the *Blood*, either by *Medicine* or *Ligament*; but was faine to have the *Orifice* of the *Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at the least of two *Dayes*; And at the last the blood by *Custom* onely retired. There is a fifth *Way* also in use, to let *Blood* in an *Adverse Part*, for a *Revulsion*.

Experiment
Solitary, tou-
ching *Change* of
Aliments and
Medicines.

67.

It helpeth, both in *Medicine*, and *Aliment*, to *Change* and not to continue the same *Medicine* and *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, either of *Appetite*, or *Working*. And we see that *Assuetude* of *Things* Hurtfull doth make them leese their force to Hurt; As *Poyson*, which with use some have brought themselves to brook. And therefore it is no marvaile, though *Things* helpfull by *Custom*, leese their force to Help; I count *Intermission* almost the same thing with *Change*; For that, that hath been intermitted, is after a sort new.

It

IT is found by Experience, that in *Diets of Guaiacum, Sarza,* and the like, (especially if they be strict) the *Patient* is more troubled in the beginning, than after continuance; which hath made some of the more delicate Sort of *Patients*, give them over in the midst; Supposing that if those *Diets* trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie up *Humours, Rheums,* and the like; And they cannot Drie up untill they have first attenuated; And while the *Humour* is attenuated, it is more Fluid, than it was before, and troubleth the Body a great deale more, untill it be dried up, and consumed. And therefore *Patients* must expect a due time, and not check at them at the first.

Experiment
Solitary, tou-
ching *Diets*.
68.

THE Producing of Cold is a thing very worthy the Inquisition; both for Use, and Disclosure of Causes. For *Heat* and *Cold* are *Natures* two hands, whereby she chiefly worketh: And *Heat* we have in readinesse, in respect of the *Fire*; But for *Cold* we must stay till it cometh; or seek it in deep Caves, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces of Fire* are farre hotter, than a *Summers Sun*; But *Vaults* or *Hills* are not much Colder than a *Winters Frost*.

Experiments
in Consort
touching the
Production of
Cold.

The first *Meanes* of Producing Cold, is that which *Nature* presenteth us withall; Namely, the *Expiring* of cold out of the *Inward Parts of the Earth* in *Winter*, when the *Sun* hath no power to overcome it; the *Earth* being (as hath been noted by some) *Primum Frigidum*. This hath been asserted, as well by Ancient, as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the discourse in *Plutarch*, (for I take it, that booke was not *Plutarchs* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Novelists*.

69.

The second Cause of Cold is the Contact of Cold Bodies; For Cold is Active and Transitive into Bodies Adjacent, as well as Heat: which is seen in those things that are touched with Snow or Cold water. And therefore, who-soever will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of Snow and Ice; Such as they use for delicacy, to coole Wine in Summer: Which is a Poore and Contemptible use, in respect of other uses, that may be made of such *Conservatories*.

70.

The Third Cause is the Primary Nature of all Tangible Bodies: For it is well to be noted, that all Things whatsoever (*Tangible*) are of themselves Cold; Except they have an Accessory Heat by fire, Life, or Motion: For even the Spirit of Wine, or Chymicall Oyles, which are so hot in Operation, are to the first Touch, Cold; And Aire itself compressed, and Condensed a little by blowing, is Cold.

71.

The Fourth Cause is the Density of the Body; For all Dense Bodies are Colder than most other Bodies; As Metals, Stone, Glasse; and they are longer in Heating than Softer Bodies. And it is certaine, that Earth, Dense, Tangible, hold all of the Nature of Cold. The Cause is, for that all Matters Tangible being Cold, it must needs follow, that where the Matter is most Congregate, the Cold is the greater.

72.

The

73.

The Fifth Cause of Cold, or rather of increase and vehemency of Cold, is a *Quick Spirit inclosed in a Cold Body*: As will appeare to any that shall attentively consider of *Nature* in many Instances. We see *Nitre* (which hath a *Quick Spirit*) is Cold; more Cold to the Tongue, than a Stone; So *Water* is Colder than *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digested than *Water*, yet hath it a duller *Spirit*: So *Snow* is Colder than *Water*, because it hath more *Spirit* within it: So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Activity* of Cold: So some *Insecta* which have *Spirit of Life*, as *Snakes*, and *Silkworms*, are to the touch, Cold. So *Quick-silver* is the Coldest of Metals, because it is *fullest of Spirit*.

74.

The Sixth Cause of Cold is the *Chasing and Driving away of Spirits*, such as have some *Degree of Heat*: For the Banishing of the *Heat* must needs leave any Body Cold. This we see in the Operation of *Opium*, and *Stupefactive*s, upon the *Spirits* of living Creatures: And it were not amisse to trie *Opium*, by laying it upon the Top of a *Weather-glasse*, to see whether it will contract the *Ayre*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as *Glasse*, I conceive that *Opium*, and the like, make the *Spirits* flie rather by *Malignity*, than by Cold.

75.

Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the flight of the *Spirits*. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sun* is of Cold and *Moisture*: It were not amisse therefore to trie it, with *Warm-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreen betwixt the Beames of the *Moone* and the *Water*; As we use to the *Sun* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may be, to draw forth the *Exile heat* which is in the *Aire*; for that may be a Secret of great Power to Produce Cold weather.

Experiments
in Consort
touching the
Version and
Transmutation
of *Aire* into
Water.

WE have formerly set downe the *Meanes of turning Aire into Water*, in the *Experiment 27*. But because it is *Magnale Nature*; and tendeth to the subduing of a very great effect; And is also of Manifold use; we will adde some *Instances in Consort* that give light thereunto.

76.

It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of Wooll* on the sides of their *Ships*, the *Wooll* towards the *Water*; And that they have crushed fresh *Water* out of them, in the Morning, for their use. And thus much we have tryed, that a *Quantity* of *Wooll* tyed loose together, being let down into a deep *VVell*; And hanging in the *Middle*, some thre Fathome from the *Water*, for a night, in the *Winter* time; increased in weight, (as I now remember) to a fifth Part.

77.

It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certain *VVork-men*, in time of wars fled into *Caves*; And the Mouth of the *Caves* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the *Vessels* full of *Water*; And that *Water*, thicker, and more towards *Ice*, than *Common Water*: which is a Notable Instance of *Condensation*, and *Induration* by *Buriall under Earth*, (in *Caves*) for long time; And of *version* also (as it should seem) of *Aire into Water*; if

if any of those vessels were Empty. Trye therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunk; you may be sure the *Aire* is condensed by the *Gold* of those *Bodies*; As it would be in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *Water* open in a Roome where *Cloves* are kept, it will be drawne drie in 24 houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *Wooll* is new shorne, to set some Pails of *Water* by, in the same Roome; to increase the weight of the *Wooll*. But it may be, that the Heat of the *Wooll*, remaining from the body of the Sheep; or the Heat gathered by the lying close of the *Wooll*, helpeth to draw the watrie Vapour; But that is nothing to the *Version*.

It is reported also credibly, that *Wooll* new shorne, being laid casually upon a Vessell of *Verjuice*, after some time, had drunke up a great part of the *Verjuice*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuice* through the wood; For *Verjuice* of it self would never have passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *Water*, when the *Aire* is not in gross, but subtilly mingled with *Tangible Bodies*, is, (as hath been partly touched before) for that *Tangible Bodies* have an Antipathy with *Aire*; and if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they have drawn it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *Wooll*, or *Sugar*, or a *Woollen-cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquor* higher, and beyond the place: where the *Water* or *Wine* cometh. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in *Water*, which will make *Wood* to Swell: As we see in the *Filling* of the *Chops* of *Boules*, by laying them in *Water*. But for that part of these *Experiments*, which concerneth *Attraction*, we will reserve it to the proper Title of *Attraction*.

There is also a *Version* of *Aire* into *Water*, seen in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before & in moist weather: This must be, either by some *Moysture* the Body yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plain, that it is the latter; For that we see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it back, and thickneth it into Dew. We see also, that *Breathing* upon a *Glasse*, or Smooth body giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon the Inside of *Glasse-windowes*; And the *Frost* it self upon the ground, is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watrie substance: *Dewes* likewise, and *Raine*, are but the Returns of Moist vapours Condensed; The Dew, by the Cold onely of the Suns departure, which is the gentler Cold; *Raine*, by the Cold of that, which they call the *Middle Region* of the *Aire*; which is the more violent Cold.

It is very probable (as hath been touched) that that, which will turne

Water

78.

79.

80.

81.

82.

Water into *Ice*, will likewise turne *Aire* some Degree nearer unto *Water*. Therefore trie the *Experiment* of the *Artificiall Turning Water into Ice* (whereof we shall speak in another place) with *Aire* in place of *Water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *Water*, than *Water* into *Ice*: Yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that *Artificiall Conversion* of *Water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Months space, or the like.

Experiments
in Confort
touching In-
duration of
Bodies.

Induration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The first is by *Cold*; whole Propertie is to *Condense*, and constipate, as hath been said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to avoid *Vacuum* (as they call it) And also to Munite themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Minerals*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Brick*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But we will speak of them distinctly.

83.

For *Indurations* by *Cold*, there be few Trials of it; For we have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sun, and the Heavens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *Wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*) a Piece of *Wood*, or a Piece of *Tough Clay*, and let it lie a month, or more.

84.

Another Triall is by *Metalline Waters*, which have virtuall *Cold* in them.

Put

Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And trie whether it will not harden in some reasonable time. But I understand it, of *Metalline Waters*, that come by Washing, or Quenching; And not of *Strong Waters* that come by dissolution; for they are too Corrosive to consolidate.

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you shall see one piece of *Wood*, whereof the Part above the *Water* shall continue *Wood*; And the Part under the *Water* shall be turned into a kinde of *Gravelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found having lien many yeares in the bottome of a Moat, where the Earth had somewhat overgrown it; And this *Egge* was come to the Hardnesse of a *Stone*; And had the Colours of the White and Yolke perfect: And the Shell shining in small graines like Sugar, or Alabaster.

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Metalls* themselves are hardened by often *Heating* and *Quenching* in *Cold water*: For *Cold* ever worketh most potently upon *Heat* precedent.

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Bodie; As in *Bricks*, *Tiles*, &c. Or if the *Heat* be more fierce, maketh the groffer Part it self, Run and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (as we see in the Inner Parts of *Fornaces*) And in the *Vitrification* of *Brick*; And of *Metals*. And in the former of these, which is the Hardening by baking, without Melting, the *Heat* hath these degrees; First, it *Indurath*; and then maketh *Fragile*; And lastly, it doth *Incinerate*, and *Calcinate*.

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragilitie; A middle way would be taken; Which is that which *Aristotle* hath well noted; but would be thoroughly verified. It is, to decoct *Bodies* in *Water*, for two or three daies; But they must be such bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long Seething, will rather Soften than Indurate them; As hath been tried in *Egges*, &c. Therefore, Softer *Bodies* must be put into Bottles; And the Bottles hung into *Water* seething, with the mouths open, above the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Body adust, or fragile; But the Substance of the *Water* will be shut out. This *Experiment* we made; and it sorted thus. It was tryed with a piece of *Free stone*, and with *Pewter*, put into the *Water* at large. The *Free-stone* we found received in some *Water*; For it was softer and easier to scrape, than a piece of the same *Stone* kept drie. But the *Pewter* into which no *Water* could enter, became more white, and liker to Silver, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Piece of *Cheese*, a Piece of *Chalke*, and a Piece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-stone* much harder than they were. The Colour of the *Clay* inclined not a whit to the Colour of *Brick*, but rather to white, as in ordinary Drying by the Sun. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *Water* as it consumed, with other hot *Water*; But the Boyling was

85.

86.

87.

88.

was but for twelve houres onely ; And it is like that the Experiment would have been more effectually, if the Boyling had been for two or three dayes, as we prescribed before.

89.

As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) we see Examples of it in some *Stones*, in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is ; In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* between them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble Stones*, thick set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lump, in which no *Pebbles* are set. We see also in Ruines of old Walls, especially towards the Bottome, the *Mortar* will become as hard as the *Brick* ; We see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *Wood* it self; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90.

Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures* : For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary, touch-
ing the Ver-
sion of Water
into Aire.

91.

THE Eye of the Understanding, is like the Eye of the Sense : For as you may see great Objects through small Crannies, or Levels : So you may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon watry *Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body ; Such as doth not at all Detaine, or Imbibe the *Moisture*; For the *Mistiness* scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oylie*, or *Fatty*, will not discharge ; Not because it sticketh faster ; But because *Aire* preyeth upon *Water* ; And *Flame*, and *Fire*, upon *Oyle* ; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper ; Because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist ; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* medleth little with the *Moisture* of *Oyle*.

Experiment
Solitary, touch-
ing the Force
of Union.

92.

THERE is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Union*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme ; And the Resisting of a New. For marke well the discharge of that *Cloud* ; And you shall see it ever break up, first in the Skirts, and last in the Midst. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused ; But little water, is imbibed by the Body : And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small ; And so deceiveth many ; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment
Solitary, touch-
ing the Pro-
ducing of Fea-
thers and Hairs
of divers Co-
lours.

93.

WE have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds* ; Which is by the Fineness of the Strainer ; we will now endeavour to reduce the same *Axiome* to a *Werke*. For this Wri-
ting

ting of our *Sylva Sylvarum*, is (to speak properly) not *Naturall History*, but a high kind of *Naturall Magick*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Try therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their Down; Or of *Whelps*, cutting their Haire as short as may be: Or of some other Beast; with some oyntment, that is not hurtfull to the flesh; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, clean, will make the new come forth *White*: And it is certain, that *White* is a penurious Colour, and where moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turn *Pale & White*; *Birds*, and *Horses*, by Age, or Scarres, turn *White*: and the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skinne is more porous; But when the Skin is more shut, and close, the *Feathers* will come *White*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of Colours themselves; which of them require a finer Porosity, and which a grosser.

IT is a worke of Providence, that hath been truely observed by some; That the *Yolk* of the *Egge*, conduceth little to the *Generation* of the *Bird*; but onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall find much of the *Yolk* remaining. And it is needfull, that *Birds*, that are shaped without the Females Womb, have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; but onely a quickning Heat when she sitteth. But Beasts, and Men need not the matter of Nourishment within themselves; because they are shaped within the Womb of the Female, and are Nourished continually from her Body.

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kind of *Stone*, which they bring out of the *West-Indies*, hath a peculiar force to move Gravell, and to dissolve the *Stone*; in so much as laid but to the Wrest, it hath so forcibly sent down Gravell, as Men have been glad to remove it; It was so violent.

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shot*, to those that use it not, affecteth both: Applications of *hot Pouders* to the *feet* attenuate first, and after dry the *Rheume*: And therefore a *Physitian*, that would be Mystically, prescribeth, for the Cure of the *Rheume*, that a Man should walk Continually upon a *Camomill* alley; Meaning, that he should put *Camomill* within his Socks. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke sleepe.

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*: We see the affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tryed, that Juices of *Stock-gilly-flowers*, *Rose-campion*, *Garlick*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*.

D

And

Experiments
Solitary touching the Nourishment of Living Creatures before they be brought forth.

94.

Experiments
in Consort touching Sympathy and Antipathy for Medicinall use.

95.

96.

97.

And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the *Hands*, *Egges* of *Alabaster*, and *Balls* of *Crystall*.

Of these things we shall speake more, when we handle the Title of Sympathy and Antipathy, in the proper place.

Experiment
Solitary touch-
ing the Se-
cret Processes of
Nature.

98.

THE Knowledge of man (hitherto) hath been determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Finenesse* of the *Body* it selfe; or the *Smalnesse* of the *Parts*; or of the *Subtilty* of the *Motion*; is little inquired. And yet these be the Things that Govern Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce known. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficial Speculations they have; Like Prospectives, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Natural Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are never (almost) at rest: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and most of the Effects of Nature. For, as we have figured them in our *Sapientia Veterum*, in the *Fable* of *Proserpina*, you shall in the *Infernall Regiment* heare little doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in *Bodies* are Stupid things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the industry of the *Chymists* hath given some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of *Bodies*, and the like. And the *Physitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a *Stupefactive Part*, and a *Heating Part*; The one moving Sleep, the other a Sweat following; And that *Rubarb* hath *Purging Parts*, and *Astringent Parts*, &c. But this whole *Inquisition* is weakely and Negligently handled. And for the more subtile differences of the *Minute Parts*, and the Posture of them in the *Body*, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of *Bodies*, which doe so great Effects, they have not been observed at all; because they are Invisible, and incur not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seen in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientiae esse convincitur; Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all *Flight* of Bodies thorow the *Aire*, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be thoroughly handled in due place,) is not scene at

at all. But neverthelesse, if you know it not, or enquire it not attentively and diligently, you shall never be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Again, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the Effects (which were mentioned before) passe between the *Spirits*, and the *Tangible Parts*, (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most advanced, when it worketh upon a Body, without losse or dissipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceived in *Distillations*, which are performed in close Vessels, and Receptacles. But yet there is a higher Degree; For howsoever *Distillations* do keepe the Body in Cells, and Cloysters, without Going abroad, yet they give space unto Bodies to turne into Vapour; To return into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Liberty: Whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarefaction*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Proteus* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoses*. Take therefore a *square Vessell* of *Iron*, in forme of a Cube, and let it have good thicke and strong Sides. Put into it a Cube of *Wood*, that may fill it as close as may be; And let it have a Cover of *Iron* as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales* kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Cover, and see what is become of the *Wood*. I conceive that since all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* still turned upon it Selfe, that one of these two Effects will follow; Either that the *Body* of the *Wood* will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Aire*, and the Grofser sticke as it were baked, and incrustate upon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it selfe, Crude. And for another Triall, take also *Water*, and put it in the like Vessell, stopped as before; But use a gentler *Heat* and remove the Vessell sometimes from the *Fire*; And againe, after some small time, when it is Cold renew the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *Water*, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste, after the manner of Compound Bodies, you may be sure that there is a great Worke wrought in *Nature*, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made to doe that by *Fire*, in small time, which the *Sunne* and *Age* doe in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we call it) which is like the *Wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paracelsus Pigmeys*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall under the Conceit of Man; If the force of it be altogether kept in.

Experiment
Solitary touching the
Power of Heat.

99

Experiments
Solitary tou-
ching the Im-
possibility of
Annihilation.

100.

There is nothing more Certain in Nature, than that it is impossible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Seēt* of the *Chymists*; that there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeavour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preservation of *Bodies* from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, because they are utterly Heterogeneous; Nor make a *Round* and *Circulation* within themselves; they will never change, though they be in their Nature never so Perishable, or Mutable. Wee see, how *Flies* and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument* and *Embalming* of the *Body* of any *King*. And I conceive the like will be of *Bodies* put into *Quick-silver*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Crassitude, they will alter in their own Body, though they spend not. But of this, Wee shall speake more, when we handle the *Title of Conservation of Bodies*.

NA-



NATVRALL HISTORIE.

II. Century.



MUSICK in the *Practice*, hath been well pursued; And in good Variety; But in the *Theory*, and especially in the *Yeelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine *Myfticall* Subtilties, of no use, and not much Truth. We shall therefore, after our manner, joine the *Contemplative* and *Active Part* together.

Experiments
in Confort
touching
Musick.

All *Sounds* are either *Musicall Sounds*, which we call *Tones*; Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ring* of *Bels*, &c. Or *Im-musicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *Whisperings*, all *Voices of Beasts*, and *Birds*, (except they be *Singing Birds*), all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins*, (as in *Drums*) and infinite others.

101.

The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their *Parts* and *Pores Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bels*; Of *Glasse*, as in the *Fillipping* of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilst they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingals Pipes* of *Regalls*, or *Organs*, and other *Hydraulicks*; which the *Ancients* had and *Nero* did so much esteem, but are now lost. And if any Man think, that the *String* of the *Bow*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bow* or *Plectrum*, and the *String*; But between the *String* & the *Aire*; No more than it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that

102.

create *Tones* ; *Percussion* of *Metals*, (comprehending *Glasse*, and the like) *Percussions* of *Aire* ; and *Percussions* of *Water*.

103.

The *Diapason* or *Eight* in *Musick* is the sweetest *Concord*, In so much, as it is in effect an *Vnison* ; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another, which make but as one *Sound*. And every *Eight Note* in *Ascent*, (as from *Eight* to *Fifteen*, from *Fifteen* to *Twenty two*, and so *in infinitum*) are but *Scales of Diapason*. The *Cause* is dark, and hath not been rendred by any ; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much *Variety* ; As we see in the *Voices of Living Creatures* ; And likewise in the *Voices* of severall *Men* ; (for we are capable to discern severall *Men* by their *Voices*) And in the *Conjugation of Letters*, whence *Articulate Sounds* proceed ; which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it self into any such variety ; But is forced to recurre into one and the same *Posture* or *Figure*, onely differing in *Greatnesse* and *smalnesse*. So we see *Figures* may be made of lines, *Crooked* and *Straight*, in infinite *Variety*, where there is *Inequality* ; But *Circles*, or *Squares*, or *Triangles Equilaterall*,) which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

104.

It is to be noted (the rather lest any Man should think, that there is any thing in this *Number of Eight*, to create the *Diapason*) that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to be, by *Distribution* into *equall Portions*. Now there be intervenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Half-notes* ; So as if you divide the *Tones* equally, the *Eight* is but *Seven* whole and *equall Notes* ; And if you subdivide that into *Half-notes*, (as it is in the *Stops of a Lute*) it maketh the *Number of Thirteen*.

105.

Yet this is true ; That in the ordinary *Rises* and *Falls* of the *Voice of Man*, (not measuring the *Tone* by whole *Notes*, and half *Notes*, which is the *Equall Measure*) there fall out to be two *Beemolls* (as hath been said) between the *Vnison* and the *Diapason* : And this *Varying* is naturall. For if a Man would endeavour to raise or fall his *Voice*, still by *Half-notes*, like the *Stops of a Lute* ; or by whole *Notes* alone, without *Halves* ; as farre as an *Eight* ; he will not be able to frame his *Voice* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonicall use*, one *half Note* to be interposed.

106.

It is to be considered, that whatsoever *Vertue* is in *Numbers*, for *Conducing* to *Concent of Notes*, is rather to be ascribed to the *Ante-number*, than to the *Entire Number* ; As namely, that the *Sound* returneth after *Six*, or after *Twelve* ; So that the *Seventh* or the *Thirteenth* is not the *Matter*, but the *Sixth*, or the *Twelfth* ; And the *Seventh* and the *Thirteenth* are but the *limits* and *Boundaries of the returne*.

107.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, between the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect* ; the *Third* next ; And the *Sixth* which is more harsh : And as the *Ancients* esteemed, and so doe my self and some Other yet, the *Fourth* which they call *Diatesseron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so *in Infinitum*, they be but *Recurrences* of the *Former*, viz. of the *Third*, the *Fifth*, and the *Sixth* ; being an *Eight* respectively from them.

108.

For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense* ; whereof the *One* is next above the *Vnison*, the Other

Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturb the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therefore the ordinary *Concent* of *Four Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more *Aire*, doth overcome and drown the *Treble*, (unlesse the *Discord* be very Odious) And so hideth a small Imperfection. For we see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but only the Sound of the *Base*.

We have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Half-Notes* themselves doe but interpose sometimes. Nevertheless we have some *Slides* or *Relishes*, of the *Voyce*, or *Strings*, as it were continued without *Notes*, from one *Tone* to another, rising, or falling, which are delightfull.

The *Causes* of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight* (leaving *Pictures*, and *Shapes* aside, which are but *Secondary Objects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The pleasing of *Colour* symbolizeth with the pleasing of any *Single Tone* to the *Eare*; But the pleasing of *Order* doth symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets* of *Houses*, and all equall and well answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*, *Good Proportion*, or *Correspondence*: So that (out of *Question*) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speak somewhat, (when we handle *Tones*) in the generall Enquiry of *Sounds*.

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are *Equall*, and slide not, doe more strike and erect the *Sense*, than the other. And Overmuch *Attention* hindreth *Sleep*.

There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetorick*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quavering*, which please so much in *Musick*, have an Agreement with the *Glittering* of *Light*; As the *Moon-Beames* playing upon a *Wave*. Again, the *Falling* from a *Discord* to a *Concord*, which maketh great *Sweetnesse* in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetorick*, which they call *Præter Expectatum*; For there is a *Pleasure* even in being deceived. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

It hath been anciently held, and observed, that the *Sense of Hearing*, and the *Kindes of Musick*, have most Operation upon *Manners*; As to *Encourage Men*,

109.

110.

111.

112.

113.

114.

Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclin'd to Pity, &c. The Cause is, for that the *Sense of Hearing* striketh the *Spirits* more immediately, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Access to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediately upon the *Spirits*, and is forcible while the Object remaineth) it is with a communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring easily, and Mingling not at all, and Coming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see that *Tunes* and *Aires*, even in their owne nature, have in themselves some Affinitie with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens minds to Pity*; *Warlike Tunes*, &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predisposition to the *Motion* of the *Spirits* in themselves. But yet it hath been noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. We see also that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Experiments
in Confort
touching
Sounds; and
first touching
the Nullity,
and Entity
of *Sounds*.

Perspective hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as farre as concerneth *Musick*. But the *Nature of Sounds* in generall, hath been superficially observed. It is one of the subtillest Pieces of Nature. And besides, I practise, as I doe advise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

115.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to us perceived; Though in some *Dreames* they have been said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from us, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neare at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Division of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which we call the *Rack*) and are not perceived below) passe without *Noise*. The *lower Windes* in a *Plaine*, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise*, of such *Windes* will be perceived. And the *Windes* (generally) when they make a *Noise*, doe ever make it unequally, Rising and Falling, and sometimes (when they are vehement) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently) yeeldeth no *Noise*, in passing through the *Aire*, till it fall upon the *Ground*, *Water*, *Houses*, or the like. *Water* in a *River* (though a swift *Stream*) is not heard in the *Channel*,
but

but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallows*, or *Gravell*, or *Pebble*, will be heard. And *Waters*, when they beat upon the *Shore*, or are straitned, (as in the falls of *Bridges* ;) Or are dashed against themselves, by *Windes*, give a *Roaring Noise*. Any peece of *Timber*, or *Hard body*, being thrust forwards by another *Body* *Contiguous*, without knocking, giveth no *Noise*. And so *bodies* in weighing, one upon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though unobserved;) passeth without *Sound*; For that *Sound*, that is heard somtimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the *Parts*. So it is manifest; That where the *Anterior Body* giveth way, as fast as the *Posterior* commeth on, it maketh no *Noise*, be the *Motion* never so great, or swift.

Aire open, and at *large*, maketh no *Noise*, except it bee sharply percussed; As in the *Sound* of a *String*, where *Aire* is percussed by a hard, and stiffe *Body*; And with a sharp loose: For if the *String* be not strained, it maketh no *Noise*. But where the *Aire* is pent, and straitned, there *Breath*, or other *Blowing*, (which cary but a gentle Percussion,) suffice to create *Sound*: As in *Pipes*, and *wind-instruments*. But then you must note, that in *Recorders*, which goe with a gentle *Breath*, the *Concave* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire*, (much more then the *Simple Concave* ;) would yeeld no *Sound*. For as for other *Wind-Instruments*, they require a forcible *Breath*; As *Trumpets*, *Cornets*, *Hunters-Hornes*, &c. Which appeareth by the blowne-*Cheeks* of him that windeth them. *Organs* also are blowne with a strong winde, by the *Bellows*. And note againe, that some kinde of *Wind-Instruments*, are blowne at a small *Hole* in the side, which straitneth the *Breath* at the first entrance; The rather, in respect of their *Traverse*, and *Stop* above the *Hole*, which performeth the *Fipples Part*; As it is seene in *Flutes*, and *Fifes*, which will not give *Sound*, by a blast at the end, as *Recorders*, &c. doe. Likewise in all *whistling*, you contract the *Mouth*; And to make it more sharpe, Men sometimes use their *Finger*.

But in *Open Aire*, if you throw a *Stone*, or a *Dart*, they give no *sound*: No more doe *Bullets*, except they happen to be a little hollowed in the *Casting*; Which *Hollownesse* penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their *Feathers*, which likewise penneth the *Aire*. As for *small Whistles*, or *Shepherds Oaten Pipes*, they give a *Sound*, because of their extreme *Slenderesse*, whereby the *Aire* is more pent, than in a wider *Pipe*. Againe the *Voices* of *Men*, and *Living Creatures*, passe through the throat, which penneth the *Breath*. As for the *Jewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the *Mouth*.

Solide Bodies, if they be very softly percussed, give no *Sound*; As when a *Man* treadeth very softly upon *Boards*. So *Chests* or *Doores* in faire weather, when they open easly, give no *Sound*. And *Cart-Wheelles* squeak not when they are liquoured.

The *Flame* of *Tapers*, or *Candles*, though it be a swift *Motion*, and breake th the *Aire*, yet passeth without *Sound*. *Aire* in *Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it self, and is repercussed; yet it is without *Noise*.

Flame percussed by Aire, giveth a *Noise*; As in blowing of the *Fire* by *Bellows*; Greater, than if the *Bellows* should blow upon the *Aire* it selfe. And so likewise *Flame Percussing the Aire strongly* (as when *Flame* suddenly taketh and openeth,) giveth a *Noise*; So great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

There

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120

There is a Conceit runneth abroad, that there should be a *White Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murthers. But it seemeth to me impossible; For, if the *Aire pent*, be driven forth, and strike the *Aire open*, it will certainly make a *Noise*. As for the *white Powder*, (if any such thing bee, that may extinguish, or dead the *Noise*,) it is like to bee a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may bee extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Croffe Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall *Sounds*, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire pent* at the Mouth of the Peece the Bullet might flie with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath been oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Concave* of *Minall*, no more than you meane to fill with Powder; And laying the *Bullet* in the Mouth of it, halfe out into the *Open Aire*.

121

I heard it affirmed by a Man, that was a great Dealer in Secrets, but hee was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to have killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning Glasse* when she walked in *Saint Iames Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could be brought to a great strength, (as they talke generally of *Burning Glasses*, that are able to burne a *Navy*,) the *Percussion* of the *Aire*, alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings* without *Thunders*.

122

I suppose that *Impression* of the *Aire* with *Sounds*, asketh a time to be conveyed to the *Sense*; As well as the *Impression* of *Species visible*. Or else they will not be heard. And therefore, as the *Bullet* moveth so swift, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For wee see, that the *Apprehension* of the *Eye*, is quicker then that of the *Eare*.

123

All *Eruptions* of *Aire*, though small and slight, give an *Entitie* of *Sound*, which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay salt*, and *Bay leaves* cast into the Fire; So in *Chestnuts*, when they leape forth of the *Ashes*; So in *Greene Wood* laid upon the Fire, especially, *Roots*; So in *Candles* that spit *Flame*, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose leafe* gathered together into the fashion of a *Purse*, and broken upon the *Forehead*, or *Backe* of the *Hand*, as *Children* use.

Experiments
in Consort
touching Pro-
duction, Conser-
vation, and De-
latiō of Sounds;
And the office
of the *Aire*
therein.

124

THE Cause given of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting* or *Dividing*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit upon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if they have gotten a Pretty Expression by a Word of Art, that Expression goeth currant, though it be empty of Matter. This Conceit of *Elision*, appeareth most manifestly to

to be false, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, sometime, after the *Percussion*; but ceaseth straight-waies, if the *Bell*, or *String*, be touched and stayed: whereas, if it were the *Elision* of the *Aire*, that made the *Sound*, it could not bee, that the Touch of the *Bell*, or *String*, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, upon the Out-side of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Elision*, or *Attenuation* of the *Aire* cannot be but onely betweene the Hammer and the Out-side of the *Bell*. So againe, if it were an *Elision*, a broad *Hammer*, and a *Bodkin*, struck upon Metall, would give a divers *Tone*; as well as a divers Loudnesse: But they doe not so; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the same. Besides, in *Eccho's* (whereof some are as loud as the *Originall Voice*,) there is no new *Elision*, but a *Repercussion* onely. But that which convinceth it most of all, is; that *Sounds* are generated, where there is no *Aire* at all. But these and the like Conceits, when Men have cleared their understanding, by the light of Experience, will scatter, and breake up like a Mist.

It is certain, that *Sound* is not produced at the first, but with some *Locall Motion* of the *Aire*, or *Flame*; or some other *Medium*; Nor yet without some *Resistance*, either in the *Aire*, or the *Body Percussed*. For if there be a meer Yeelding or Cession, it perduceth no *Sound*; As hath beene said. And therein *Sounds* differ from *Light*, and *Colours*; which passe through the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the first, or after. But you must attentively distinguish, between the *Locall Motion* of the *Aire*, (which is but *Vehiculum causa*, a *Carrier of the Sounds*,) and the *Sounds* themselves, Conveighed in the *Aire*. For as to the former, we see manifestly, that no *sound* is produced (no not by *Aire* it selfe against other *Aire*, as in *Organs*, &c.) but with a perceptible *Blast* of the *Aire*; and with some *Resistance* of the *Aire* stricken. For even all *Speech*, (which is one of the gentlest *Motions* of *Aire*,) is with *Expulsion* of a little *Breath*. And all *Pipes* have a *Blast*, as well as a *Sound*. We see also manifestly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than against the *Wind*: and likewise doe rise and fall with the *Intension* or *Remission* of the *Wind*. But for the *Impression* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that resembleth the *Species Visible*: for after a *Man* hath lured, or a *Bell* is rung, we cannot discern any *Perceptible Motion* (at all) in the *Aire*, along as the *sound* goeth; but onely at the first. Neither doth the *Wind* (as farre as it carrieth a *Voice*,) with the Motion thereof, confound any of the *Delicate*, and *Articulate Figurations* of the *Aire*, in variety of Words. And if a *Man* speake a good loudnesse, against the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the mouth; as *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *Speaking*, will move the *Candle* farre more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation of Things visible*; which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neverthelesse it is true, that upon the *Noise* of *Thunder*, and great *Ordinance*; Glasse windowes will shake; and Fishes are thought to be frayed with

125.

126.

with the Motion, caused by *Noise* upon the water. But these Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath been said;) and not from the *Sound*.

127.

It hath been anciently reported, and is still received, that *Extreme applauses*, and *shouting of people* assembled in great Multitudes, have so rarified, and broken the *Aire*, that Birds flying over, have fallen down, the *Aire* being not able to support them. And it is beleev'd by some, that *great Ringing of Bells* in populous Cities, hath chased away *Thunder*: and also dissipated Pestilent *Aire*: All which may be also from the Concussion of the *Aire*, and not from the *Sound*.

128.

A very great *Sound*, near hand, hath stricken many Deafe; And at the Instant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my selfe standing near one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or been dislocated in my Eare; And immediately after a *loud Ringing*; (Not an ordinary Singing, or Hissing, but farre louder, and differing:) so as I feared some *Deafnesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred unto the *Sound*: for (as is commonly received) an *over-potent Object* doth destroy the *Sense*; And *spirituall Species*, (both *Visible* and *Audible*,) will work upon the Sensories, though they move not any other Body.

129.

In *Delation of Sounds*, the Enclosure of them preserveth them, and causeth them to be heard further. And we find in rowles of Parchment, or Truncks, the Mouth being laid to the one end of the rowle of Parchment, or Trunck, and the *Eare* to the other, the *Sound* is heard much further, then in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; but in such Concaves it is conserved, and contracted. So also in a Peece of Ordnance, if you speak in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

130.

It is further to be considered, how it proveth and worketh, when the *Sound* is not enclosed all the Length of his way, but passeth partly through open *Aire*; as where you *speake* some distance from a *Trunck*; or where the *Eare* is some distance from the *Trunck*, at the other End; or where both *Mouth* and *Eare* are distant from the *Trunck*. And it is tryed, that in a long *Trunck*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Trunck*; And somewhat more holpen, when the *Eare* of the *Hearer* is near, than when the *Mouth* of the *Speaker*. And it is certain, that the *Voice* is better heard in a *Chamber* from *Abroad*, than *Abroad* from within the *Chamber*.

131.

As the *Enclosure*, that is *Round about* and *Entire*, preserveth the *Sound*; so doth a *Semi-concave*, though in a lesse degree. And therefore, if you divide a *Trunck*, or a *Cane* into two, and one speak at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-concave*; but if you doe the like upon the *Mast* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one speak upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, then in the *Aire* at large.

132.

It would be tryed, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in some *Pipe* that were *Sinuous*.

It is certaine, (howsoever it crosse the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most favourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of Tongs some depth within the *Water*, and you shall heare the *Sound* of the Tongs well, and not much diminished; And yet there is no *Aire* at all present.

Take one *Vessell* of *Silver*, and another of *Wood*, and fill each of them full of *Water*, and then knap the Tongs together, as before, about an handfull from the Bottome, and you shall find the *Sound* much more Resounding from the *Vessell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the Tongs in the *Aire*, you shall find no difference, between the *Silver* and the *Wooden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Vessell*: The other, that such a Communication passeth far better, thorow *Water* than *Aire*.

Strike any *Hard Bodies* together, in the midst of a *Flame*, and you shall heare the *Sound* with little difference, from the *Sound* in the *Aire*.

The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some Affinity with the *Aire*; performeth, in some degree, the Parts of the *Aire*; As when you knock upon an *Empty Barrell*, the *Sound* is (in part) created by the *Aire* on the Out-side; And (in part) by the *Aire* in the In-side; For the *Sound* will be greater or lesser, as the Barrell is more Empty, or more Full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth from the Out-side to the In-side: And so it commeth to passe in the *Chiming* of *Bells*, on the Out-side; where also the *Sound* passeth to the In-side: And a number of other like Instances, whereof we shall speak more when we handle the *Communication* of *Sounds*.

It were extreame Grossenesse to think, (as we have partly touched before, that the *Sound* in *Strings* is made, or produced, between the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula motus*, Passages to the Creation of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first motion of the *String*; but by the *Return* or *Result* of the *String*, which was strained by the Touch, to his former Place: which Motion of *Result* is quick and sharpe; Whereas the first Motion is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuell *Trepidation*.

TAke a *Trunck*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The Cause is, for that *Sound* diffuseth it selfe in round, And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to go all into a Canale; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not only preserve *Sound*, but also encrease and sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The Cause is, for that the *Aire* and *Sound*, being first contracted at the lesser End, and afterwards having more Roome to spread at the greater End, do dilate themselves; And in comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hunters Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would be

be tried also in *Pipes*, being made *far larger* at the lower End : Or being made with a *Belly* towards the lower End ; And then issuing into a straight Concave again.

140

There is in *Saint James's Fields*, a *Conduit* of *Brick*, unto which joyneth a *low Vault*; And at the End of that, a *Round House* of *Stone* : And in the *Brick Conduit* there is a *Window*; And in the *Round House*, a *Slit* or *Rift* of some little breadth: if you cry out in the *Rift*, it will make a fearefull roaring at the *Window*. The *Cause* is the same with the former ; For that all *Concaves*, that proceed from more *Narrow* to more *Broad*, doe amplifie the *Sound* at the *Comming* out.

141

Hawkes Bells, that have *Holes* in the *Sides*, give a greater *Ring*, than if the *Pellet* did strike upon *Brasse*, in the *Open Aire*. The *Cause* is the same with the first *Instance* of the *Trunck* ; Namely, for that the *Sound* Enclosed with the *Sides* of the *Bell*, commeth forth at the *Holes* unspent, and more strong.

142

In *Drums*, the *Closeness* round about, that preserveth the *Sound* from disperfing, maketh the *Noise* come forth at the *Drum-Hole*, far more loud, and strong, than if you should strike upon the like *Skin*, extended in the *Open Aire*. The *Cause* is the same with the two precedent.

143

Sounds are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more *Thin*, (no doubt) the *Sound* pierceth better ; But when the *Aire* is more *Thick* (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse : And so it is a *Degree* of *Enclosure*. As for the *Night*, it is true also, that the *Generall Silence* helpeth.

144

There be two kinds of *Reflexions* of *Sounds* ; the one at *Distance*, which is the *Eccho* ; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly ; Of which we shall speak hereafter : The other in *Concurrence*, When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musick* upon the *Water* soundeth more ; And so likewise *Musick* is better in *Chambers* *Wainscotted*, than *Hanged*.

145

The *Strings* of a *Lute*, or *Violl*, or *Virginals*, doe give a farre greater *Sound*, by reason of the *Knot* and *Board*, and *Concave* underneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the *Upper Aire* into the *Lower*. The *Cause* is, the *Communication* of the *Upper Aire* with the *Lower*; And penning of both from *Expen*ce, or *Disperfing*.

146

An *Irish Harpe* hath *Open Aire* on both sides of the *Strings* : And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more *Resounding Sound*, than a *Bandora*, *Orpharion*, or *Cittern*, which have likewise *Wire-strings*. I judge the *Cause* to be, for that *Open Aire* on both *Sides* helpeth, so that there be a *Concave*; Which is therefore best placed at the End.

147

In a *Virginal*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent *Vent*, dampeth the *Sound*: Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

148

There is a *Church* at *Glocester*, (and as I have heard the like is in some other places ;) where if you speak against a *Wall*, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the *Fame* of that place. I suppose there is some *Vault*, or *Hollow*,

Hollow, or Isle, behinde the Wall, and some Passage to it towards the further end of that Wall, against which you speak; So as the *Voice* of him that speaketh, slideth along the Wall, and then entreth at some Passage, and communicateth with the *Aire* of the Hollow; For it is preserved somewhat by the plaine Wall, but that is too weake to give a *Sound* Audible, till it hath communicated with the back *Aire*.

Strike upon a *Bow-string*, and lay the *Horne* of the *Bow* neare your Eare, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the Sensory, by reason of the Close Holding, is percussed, before the *Aire* disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great *Entercourse* betweene those two Parts; As appeareth by this; That a harsh *grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* do not only slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity Colledge* in *Cambridge*, there was an *Vpper Chamber*, which being thought weak in the Roof of it, was supported by a Pillar of *Iron*, of the bignesse of ones Arme, in the midst of the *Chamber*; which if you had struck, it would make a little flat Noise in the *Room* where it was struck; But it would make a great Bombe in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *Well*, when they touch upon the *Water*; Or when they strike upon the side of the *Well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *open Aire*. The *Cause* is the Penning and Enclosure of the *Aire*, in the Concave of the *Well*.

Barrels placed in a Roome under the Floare of a *Chamber*, make all *Noises* in the same Chamber, more full and Resounding.

So that there be five wayes (in generall,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; and Approach to the Sensory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth passe thorow *Solid* and *Hard Bodies*, if they bee not too thick. And thorow *Water*; which is likewise a very Close Body; and such an one, as letteth not in *Aire*. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exility*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Atites* or *Eagles Stone*, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a man goe into a *Bath*, and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it (Even,) downe to the Levell of the *Water*, and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side; and so the *Aire* get out: Then let him that is in the *Bath*, dive with his Head so far under *Water*, as he may put his Head into the *Paile*, and there will come as much *Aire* bubling forth, as will make Roome for his Head. Then let him speak, and any that shall stand without, shall heare his *Voice* plainly; but yet made extreame sharp and exile, like the *Voice* of

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Puppets: But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handsomely done, if the *Paile* be put over the Mans head above Water, and then he cower downe, and the *Paile* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A man would think, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith, That *Hercules's Page Hylas* went with a Water-pot, to fill it at a pleasant *Fountaine*, that was near the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him under *Water*, keeping him alive; And that *Hercules* missing his *Page*, called him by his Name aloud, that all the Shore rang of it; And that *Hylas* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voite*, as *Hercules* thought he had been three Miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottome of the other, within a *Paile* of *Water*; And you shall find, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; even while Part of the *Sawcer* is above the *Water*; But that Flatnesse of *Sound* is joyned with a harshnesse of *Sound*; which (no doubt is caused by the inequality of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but far more low; And as if the *Sound* came from a far off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*: As if a Bell hath Cloth or Silk wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they use to line the Tablemen.

159 Triall was made in a *Recorder*, after these severall manners. The Bottome of it was set against the Palme of the Hand; stopped with Wax round about, set against a Damask Cushion; Thrust into Sand; into Ashes; into Water, (halfe an Inch under the Water;) Close to the Bottome of a Silver Basin; And still the *Tone* remained: But the Bottome of it was set against a Woollen Carpet; A Lining of Plush; A Lock of Wooll, (though loosely put in;) Against Snow; And the sound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse Resounding. So likewise *Warm Water*, when it falleth, maketh not so full a *Sound*, as *Cold*: And I conceive it is softer, and nearer the Nature of Oile; For it is more slippery; As may be perceived, in that it scowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The *Trunck* of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Unison; And let it be noted whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two *Truncks* (thorowout) hollow; And let two speak, or sing, the one long wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speak hereafter.

162 A *Bellows* blowne into the *Hole* of a *Drum*, and the *Drum* then stricken, maketh

maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindereth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blown together, lesse moveable.

THe *Loudnesse* and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sound*; For a *Base String*, though softly stricken, giveth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; and the *Treble* lesse *Aire*, but with a sharper Percussion.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a *Horne* stronger or weaker; Ringing of a *Hand-bell* harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a *Cloth*, it will give a lesse *Sound*; If against *Wood*, a greater; If against *Metall*, yet a greater; And in *Metals*, if you strike against *Gold*; (which is the more pliant,) it giveth the flatter *Sound*; If against *Silver*, or *Brasse*, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great *Noise* it maketh. We see also, that the *Charge* with *Bullet*; Or with *Paper* wet, and hard stopped; Or with *Pouder* alone, rammed in hard; maketh no great difference in the *Loudnesse* of the *Report*.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a *Whip* or *Wand*, if you strike the *Aire* with it; the Sharper and Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quick *Stroke* or *Touch*, is a great life to the *Sound*. The *Cause* is, for that the *Quick Striking* cutteth the *Aire* speedily; whereas the *Soft Striking* doth rather beat, than cut.

The *Communication* of *Sounds* (as in *Bellies* of *Lutes*, *Empty Vessels*, &c.) hath been touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart.

The *Experiment* for greatest *Demonstration* of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you strike with a *Hammer* upon the *Upper Part*, and then upon the *Midst*, and then upon the *Lower*, you shall find the *Sound* to be more *Treble*, and more *Base*, according unto the *Concave*, on the *Inside*: though the *Percussion* be onely on the *Outside*.

When the *Sound* is created between the *Blast* of the *Mouth*, and the *Aire* of the *Pipe*, it hath neverthelesse some *Communication* with the *Matter* of the *Sides* of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of *Wood*, and *Brasse*, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it selfe; So, if the *Pipe* be a little wet on the *Inside*, it will make a differing *Sound*, from the same *Pipe* dry.

That *Sound* made within *Water*, doth communicate better with a hard *Body* thorow *Water*, than made in *Aire*, it doth with *Aire*; Vide *Experimentum*, 134.

Wee have spoken before (in the *Inquisition* touching *Musicke*,) of *Musicall Sounds*, whereunto there may be a *Concord* or

Experiments
in Confort,
touching the
Loudnesse, or
Softnesse of
Sounds; and
their *Carriage*
at longer or shorter
Distance.

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Experiments
in Confort
touching the
Communication
of *Sounds*.

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168

Experiments
in Confort
touching
Equality, and
Inequality of
Sounds.

Discord in two Parts ; Which Sounds we call Tones : And likewise of *Immuscicall* Sounds ; And have given the Cause, that the Tone proceedeth of *Equality*, and the other of *Inequality*. And we have also expressed there, what are the *Equall* Bodies that give Tones, and what are the *Unequall* that give none. But now we shall speake of such *Inequalitie* of Sounds, as proceedeth, not from the Nature of the Bodies themselves, but is *Accidentall* ; Either from the *Roughnesse*, or *Obliquity* of the *Passage* ; or from the *Doubling* of the *Percutient* ; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare *Passage*, giveth a *Hoarse* and *Farring Sound* ; So the *Voice* of *Man*, when by Cold taken the *Weill* groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two *Instances* the *Sounds* are *Ingrate* ; because they are meerely *Vnequall* : But, if they be *Vnequall* in *Equality*, then the *Sound* is *Gratefull*, but *Purling*.

170 All *Instruments*, that have either *Returnes*, as *Trumpets* ; Or *Flexions*, as *Cornets* ; Or are *Drawne up*, and *put from*, as *Sackbuts*, have a *Purling Sound* : But the *Recorder*, or *Flute*, that have none of these *Inequalities*, give a cleare *Sound*. Neverthelesse, the *Recorder* it selfe, or *Pipe* moistened a little in the *Inside*, foundeth more solemnly, and with a little *Purling*, or *Hissing*. Again, a *Wreathed String*, such as are in the *Base Strings* of *Bandorae*, giveth also a *Purling Sound*.

171 But a *Lute-string*, if it be meerely *Vnequall* in his Parts, giveth a *Harsh* and *Untuneable Sound* ; which *Strings* we call *False*, being bigger in one Place then in another ; And therefore *Wire-strings* are never *False*. We see also, that when we try a *False Lute-string*, we use to extend it hard between the *Fingers*, and to fillip it ; And if it giveth a double *Species*, it is *True* ; But if it giveth a *treble*, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the *Eare* a *Trembling Noise* ; And in *Regals*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall *Trembling* : And *Children* have also little Things they call *Cockes*, which have *Water* in them ; And when they blow, or whistle in them, they yeeld a *Trembling Noise* ; Which *Trembling* of *Water*, hath an affinity with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an *Asper Sound*, For that the *Base* striketh more *Aire*, than it can well strike equally : And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* *Equall* : And therefore a *Meane*, or *Tenor*, is the sweetest Part.

174 We know Nothing, that can at pleasure make a *Muscicall*, or *Immuscicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The Cause is, (no doubt) in the *Weasill* or *Wind-Pipe*, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equality* ; As a *Bladder* that is wrinkled, if it be extended, becommeth smooth. The *Extension* is alwayes more in *Tones*, than in *Speech* : Therefore the *Inward Voice* or *Whisper* can never give a *Tone* : And in *Singing*, there is (manifestly) a greater *Working* and *Labour* of the *Throat*, than in *Speaking* ; as appeareth in

in the Thrusting out, or Drawing in of the Chinne, when we sing.

The *Humming* of Bees, is an *Unequall Buzzing*; and is conceived, by some of the Ancients, not to come forth at their Mouth, but to be an *Inward Sound*: but (it may be) it is neither; but from the motion of their Wings; For it is not heard but when they stirre.

All *Metalls quenched* in *Water*, give a *Sibilation* or *Hissing* sound; (which hath an *Affinity* with the letter *Z*.) notwithstanding the *Sound* be created between the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small store of *Water*, in a *Vessell*, giveth a *Hissing Sound*; but *Boyling* in a full *Vessell*, giveth a *Bubling Sound*, drawing somewhat neer to the *Cocks* used by *Children*.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality* of *Sound*; as if three *Bells* were made one within another, and *Aire* betwixt each; and then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*.

IT is evident, that the *Percussion* of the *Greater Quantity* of *Aire*, causeth the *Baser Sound*; And the *lesse Quantity*, the more *Treble* sound. The *Percussion* of the *Greater Quantity* of *Aire*, is produced by the *Greatnesse* of the *Body Percussing*; by the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base Pipe* hath a greater bore then a *Treble*; And in *Pipes*, and the like, the lower the *Note Holes* be, and the further off from the *Mouth* of the *Pipe*, the more *Base Sound* they yeeld; and the neerer the *Mouth*, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *An-diron* of *Brasse*, at the *Top*, it maketh a more *Treble Sound*; and at the *Bottom* a *Baser*.

Experiments
in Consort
touching the
more Treble,
and the more
Base Tones, or
Musical
Sounds.

178.

It is also evident, that the *Sharper* or *Quicker Percussion* of *Aire* causeth the more *Treble Sound*, and the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*, the more they are wound up, and strained; (And thereby give a more quick *Start back*;) the more *Treble* is the *Sound*. And the flacker they are, or lesse wound up, the *Baser* is the *Sound*. And therefore a bigger *String* more strained, and a lesser *String*, lesse strained, may fall into the same *Tone*.

179.

Children, *Women*, *Eunuchs* have more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) but from the *Dilatation* of the *Organ*; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of *Puberty*, is more obscure. It seemeth to be, for that when much of the *Moysture* of the *Body*, which did before irrigate the *Parts*, is drawne down to the *Spermatikall vessels*; it leaveth the *Body* more hot then it was; whence cometh the *Dilatation* of the *Pipes*: For we see plainly, all Effects of Heat, doe then come on; As *Pilosity*, more *Roughnesse* of the *Skinne*, *Hardnesse* of the *Flesh*, &c.

180

The *Industry* of the *Musitian*, hath produced two other *Meanes* of *Straining*, or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* of

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of the *String* with the *Finger* ; As in the Necks of Lutes, Viols, &c. The other is the *Shortnesse* of the *String* ; As in Harps, Virginalls, &c. Both these have one, and the same reason ; For they cause the *String* to give a quicker Start.

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In the *Straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note* ; For it requireth good Winding of a *String*, before it will make any *Note* at all : And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is between the Frets.

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If you fill a *Drinking Glasse* with *Water*, (especially one Sharp below, and Wide above,) and Fillip upon the Brim, or Out-side ; And after empty Part of the *Water*, and so more and more, and still try the *Tone* by Fillipping ; you shall find the *Tone* fall, and be more *Base*, as the *Glasse* is more Empty.

Experiments
in Confort
touching the
Proportion of
Treble and Base
Tones.

The Just and Measured Proportion of the *Aire Percussed*, towards the *Basenesse* or *Trebleness* of *Tones*, is one of the greatest Secrets in the Contemplation of Sounds. For it discovereth the true Coincidence of *Tones* into *Diapasons* ; Which is the Returne of the same Sound. And so of the *Concords* and *Discords*, betweene the *Unison*, and *Diapason* ; Which we have touched before, in the *Experiments* of *Musick* ; but think fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of Sounds. It may be found out in the *Proportion* of the *Winding* of *Strings* ; In the *Proportion* of the *Distance* of *Frets* ; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

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Try therefore the *Winding* of a *String* once about, as soon as it is brought to that Extension, as will give a *Tone* ; And then of twice about ; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone* : Whereby you shall discover, in one, two Effects ; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding* ; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will be, to take the Length in a right Line of the *String*, upon any *Winding* about of the Pegge.

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As for the *Stops*, you are to take the *Number* of *Frets* ; And principally the *Length* of the *Line*, from the first Stop of the *String*, unto such a Stop as shall produce a *Diapason* to the former Stop, upon the same *String*.

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But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments* : And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a fingle, double, and so on to a sextuple *Bore* ; And so marke what Fall of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe, what *Length* of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set downe what Encrease of *Concave* goeth to the making of a *Note* higher ; And what of two *Notes* ; And what of three *Notes* ; And so up to the *Diapason* : For then the great Secret of *Numbers* and *Proportions*, will appeare. It is not unlikely, that those that make *Recorders*, &c. know this already : for that they make them in *Sets*. And likewise *Bell-founders* in fitting the

the tune of their *Bells*. So that Enquiry may save Triall, Surely, it hath been observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell-full*; But how that should be, I doe not well understand; For that the knocking of a *Barrell, Full or Empty*, doth scarce give any *Tone*.

There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it be not too neare, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it bee true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may be both *Musicall* and *Immusicall*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we mean) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

Experiments
in Confort
touching *Ex-
teriour*, and *In-
teriour Sounds*.

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In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellows*, or *Wind*, (though lowd) is an *Interiour Sound*; But the *Blowing* thorrow a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise the greatest *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The *Whistling* or hollow *Wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The later being pent in by his own *Density*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moveth within it selfe, or is blown by a *Bellows*, giveth a *Murmur* or *Interiour Sound*.

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There is no *Hard Body*, but struck against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the *Percussion* be over-soft, it may induce a *Nullity* of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

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Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a *Bellows* against a *Wall*.

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Sounds (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

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It

Experiments
in Confort
touching Arti-
culation of
Sounds.

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IT is evident, and it is one of the strangest Secrets in *Sounds*: that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is also in every small *Part* of the *Aire*. So that all the curious Diverſitie of *Articulate Sounds* of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

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The *Vnequall Agitation* of the *Winds*, and the like, though they be materiall to the Carriage of the *Sounds*, further or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still; as hath been partly touched.

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Over-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound* will confound another; as when many ſpeake at once.

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In the *Experiment* of *Speaking under Water*, when the Voice is reduced to ſuch an Extreme Exility, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath been ſaid.

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I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſperſing*: And although (as was formerly ſaid) a *Sound Articulate*, already created, will be contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimension.

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It hath been obſerved, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Roofe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent Words* vaniſh: And therefore the *Articulate Sounds* are more confused, though the Groſſe of the *Sound* be greater.

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The *Motions* of the *Tongue*, *Lips*, *Throat*, *Palat*, &c. which go to the *Making* of the ſeverall *Alphabetical Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds*: But becauſe they are ſubtil, and long to deſcribe, we will referre them over, and place them amongſt the *Experiments* of *Speech*. The *Hebrewes* have been diligent in it, and have aſſigned, which *Letters* are *Labiall*, which *Dental*, which *Gutturall*, &c. As for the *Latines*, and *Grecians*, they have diſtinguiſhed between *Semi-vowels*, and *Mutes*; And in *Mutes*, between *Muta Tenues*, *Media*, and *Aspirata*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Strokes*, and *Motions*, that create thoſe *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters*, *N.* and *B.* cannot be pronounced, but that the *Letter*, *N.* will turne into *M.* As *Hecatonba*, will bee *Hecatomba*. That *M.* and *T.* cannot bee pronounced together; but *P.* will come between; as *Emtus*, is pronounced *Emptus*; And a number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

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The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe, it expelleth the *Aire*; which thorow the *Artire*, *Throate*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the

the help of the *Tongue, Palat*, and the rest of those they call *Instruments of voyce*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voyce Articulate*; and divers *Letters of Articulate Voyces*: And commonly Men have given such Names to those *Sounds*, as doe allude unto the Articulate Letters. As *Trembling of Water* hath Resemblance with the *Letter L*: *Quenching of Hot Metalls*, with the *Letter Z*: *Snarling of Dogs*, with the *Letter R*: The *Noise of Scritch-Owles*, with the *Letter Sh*: *Voyce of Cats*, with the *Diphthong Eu*: *Voyce of Cuckoes*, with the *Diphthong Ou*: *Sounds of Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet* or other Dead Body, to pronounce a *Word*; Let him consider, on the one Part, the Motion of the *Instruments of Voyce*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

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NA-



NATVRALL HISTORIE.

III. Century.



ALL *Sounds* (whatsoever) move Round; That is to say; On all *Sides*; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

Sounds do not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may be *Arched*; Though it be true, they move strongest in a *Right Line*; Which neverthelesse is not caused by the *Rightnesse* of the *Line*, but by the Shortness of the distance;

Linea recta brevissima. And therefore we see, if a *Wall* be between, and you speak on the one *Side*, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* over the *Wall*.

If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other *Side*, in an *Oblique Line*. So, if in a *Coach*, one side of the *Boot* be downe, and the other up; And a *Begger* beg on the *Close Side*; you would think that he were on the *Open Side*. So likewise, if a *Bell* or *Clock*, be (for Example) on the *North side* of a *Chamber*; And the *Window* of that *Chamber* be upon the *South*; He that is in the *Chamber* will think the *Sound* came from the *South*.

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Sphericall Area* of the *Sound*;) yet they move strongest, and goe furthest in the *Fore-Lines*, from the first *Locall Impulsion* of the *Aire*. And therefore in *Preaching*, you shall heare the *Preachers Voice*, better, before the *Pulpit*, than behind it, or on the *Sides*, though it stand open. So a *Harquebuz*, or *Ordinance*, will be further heard, forwards, from the *Mouth* of the *Peece*, than backwards, or on the *Sides*.

It may be doubted, that *Sounds* doe move better *Downwards*, than *Upwards*. *Pulpits* are placed high above the people. And when the *Ancient Generalls* spake to their *Armies*, they had ever a *Mount of Turfe* cast up, whereupon they stood: But this may be imputed to the *Stops* and *Obstacles*, which the voice meeteth with, when one speaketh upon the *levell*. But

F

there

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Experiments
in Consort
touching the
Motions of
Sounds, in
what Lines
they are
Circular, Ob-
lique, Straight;
Upwards,
Downwards;
Forwards,
Backwards.

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there seemeth to be more in it : For it may be, that *Spirituall Species*, both of *Things Visible* and *Sounds* doe move better *Downwards* than *Upwards*. It is a strange Thing that to Men standing below on the Ground, those that be on the Top of Pauls, seem much lesse than they are, and cannot be known; But to Men above, those below seem nothing so much lessened, and may be knowne : yet it is true, that all things to them above, seem also somewhat contracted, and better collected into Figure : as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the window, thorow a *Trunk*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Trunk*: Then *via versa*, let the other speake *below* keeping the same Proportion of Softnesse ; And let him in the *Chamber* lay his Eare to the *Trunk*. And this may be the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments
in Consort,
touching the
Lasting and
Perishing of
Sounds ; And
touching the
Time they re-
quire to their
Generation, or
Delation.

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After that *Sound* is created, (which is in a moment,) we find it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*: whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts* ; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as ever the Jack falleth, and toucheth the String, the Sound ceaseth ; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Local; As of the Bell, when it is Penfile : The other Secret, of the Minute Parts, such as is described in the ninth Instance. But it is true, that the *Local* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you have plaid; But that is but while the Bellows are in Falling.

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It is certain, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles upon the land, and much further upon the Water, But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the First *Sound* ; For there is no *Trepidation* which should renew it. And the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more then Momentany.

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To try exactly the time wherein *Sound* is Delated, Let a Man stand in a Steeple, and have with him a Taper ; And let some vaile be put before the Taper ; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell ; And in the same instant withdraw the Vaile ; And so let him in the Field tell by his Pulse what distance of Time there is between the *Light scene*, and the *Sound heard*: for it is certain that the *Delation* of Light is in an Instant. This may be tried in far greater Distances, allowing greater *Lights* and *Sounds*.

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It is generally knowne and observed, that *Light*, and the *Object* of Sight, move swifter than *Sound* ; For we see the *Flash* of a Peece is scene sooner, than

than the *Noise* is heard. And in Hewing Wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the *Noise* of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning preceedeth the Crack a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plain Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *semè quâ non*;) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly,

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In the Trials of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing by the sides* of a Body, for the *Passing thorow* a Body: and therefore you must make the *Intercepting Body* very close; For *Sound* will passe thorow a small Chinck.

Experiments
in Confort
touching the
Passage and *In-
terceptions* of
Sounds.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bels stopped, &c.) the *Hard* or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the voice must not be very deep within the *Water*: For then the *Sound* pierceth not. So if you speak on the further side of a *Close Wall*, if the *Wall* be very thick, you shall not be heard: And if there were an Hogthead empty, whereof the Sides were some two Foot thick, and the Bung-hole stopped: I conceive the Resounding *Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: but only you shall heare the *Noise* of the Outward Knock, as if the Vessell were full.

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It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are struck, than when the Percussion is only within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax, and then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weak? But note, that you must in steed of the Threed, take a Wire; or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

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It is plain, that a very *Long*, and *Down-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quiet; So that that *Sound*, which would be heard over a Wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close under the Wall.

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Soft and *Foraminous Bodies*, in the first Creation of the *Sound*, will dead it; For the striking against Cloth, or Furre, will make little *Sound*; As hath been said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windows, if they be very Close, will check a

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Sound more, than the like *Thicknesse* of *Cloth*. We see also, in the *Rumbling* of the *Belly*, how easily the *Sound* passeth thorow the *Guts*, and *Skin*.

It is worthy the Enquiry, whether *Great Sounds*, (As of *Ordnance*, or *Bels*) become not more *Weak* and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments
in Consort,
touching the
Medium of
Sounds.

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THE *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

In *Aire*, the *Thinner* or *Drier Aire*, carrieth not the *Sound* so well, as the more *Dense*; As appeareth in *Night Sounds*; And *Evening Sounds*; And *Sounds* in moist *Weather*, and *Southern Winds*. The reason is already mentioned in the *Title* of *Majoration* of *Sounds*; Being for that *Thin Aire* is better pierced, but *Thick Aire* preserveth the *Sound* better from *Waste*; Let further *Triall* be made by *Hollowing* in *Mists*, and *Gentle Showers*: For (it may be) that will somewhat dead the *Sound*.

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How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is between; But then you must allow for some disturbance, the *Noise* that the *Flame* it selfe maketh.

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Whether any other *Liquours*, being made *Mediums*, cause a diversity of *Sound* from *Water*, it may be tried: As by the *Knapping* or the *Tongs*; Or *Striking* the *Bottome* of a *Vessell*, filled either with *Milk*, or with *Oile*; which though they be more light, yet are they more unequall *Bodies* than *Aire*.

Of the *Natures* of the *Mediums*, we have now spoken; As for the *Disposition* of the said *Mediums*, it doth consist in the *Penning*, or not *Penning* of the *Aire*; Of which we have spoken before, in the *Title* of *Delation* of *Sounds*: It consisteth also in the *Figure* of the *Concave*, through which it passeth; Of which we will speak next.

Experiments
in Consort
what the *Fi-
gures* of the
Pipes, or *Con-
caves*, or the
Bodies Deferent
conduce to the
Sounds.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* passe; Or of other *Bodies deferent*; conduce to the variety and *Alteration* of the *Sounds*; Either in respect of the *Greater Quantity*, or *lesse Quantity* of *Aire*, which the *Concaves* receive; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*; they have been touched, as falling into other *Titles*. But those *Figures*, which we now are to speak of, we intend to be, as they concern the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

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The *Figure* of a *Bell* partaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewise *Straight Hornes*: which if they be of the same *Bore* with the *Oblique*, differ little in *Sound*: save that the *Straight* require somewhat a stronger *Blast*. The *Figure* of *Recorders*, and *Flutes*, and *Pipes* are straight; But the *Recorder* hath a lesse *Bore*, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that

Purling

Purling Sound &c. Generally, the *Straight Line* hath the cleanest and roundest Sound, And the *Crooked* the more Hoarse, and Jarring.

Of a *Sinuous Pipe*, that may have some foure Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the midst. And so likewise of an *Angular Pipe*: And see what will be the Effects of these severall Sounds. And so again of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you shall blow; And another Hole not farre from that; But with a *Traverse* or *Stop* between them; So that your Breath may go the Round of the *Circle*, and come forth at the second Hole. You may try likewise *Percussions* of *Solid Bodies* of severall Figures; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations*; As *Flat* against *Flat*: And *Convex* against *Convex*: And *Convex* against *Flat* &c. And mark well the diversities of the Sounds. Try also the difference in Sound of severall *Craſtitudes* of *Hard Bodies* percussed: And take knowledge of the diversities of the Sounds. I my selfe have tried, that a *Bell* of *Gold* yeeldeth an excellent Sound, not inferior to that of *Silver*, or *Brasse*, but rather better: yet we see that a piece of Money of *Gold* soundeth farre more flat than a piece of Money of *Silver*.

The *Harpe* hath the *Concave*, not along the *Strings*, but acrosse the *Strings*; And no *Instrument* hath the Sound so Melting, and Prolonged, as the *Irish Harpe*. So as I suppose, that if a *Virginal* were made with a double *Concave*; the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the *Harpe* hath; It must needs make the Sound perfecter, and not so Shallow, and Jarring. You may try it, without any Sound-Board along, but onely Harp-wise, at one End of the *Strings*: Or lastly with a double *Concave*, at Each end of the *Strings* one.

There is an apparent Diversity between the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if we look abroad, we see Heaven, a number of Starres, Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many Sounds come from severall Parts, one of them would utterly confound the other. So we see, that *Voices* or *Consorts* of *Musick* doe make an Harmony by *Mixture*, which *Colours* do not. It is true nevertheless, that a great *Light* drowneth a smaller, that it cannot be seen; As the *Sunne* that of a *Gloworme*; as well as a Great Sound drowneth a lesser. And I suppose likewise, that if there were two Lanthornes of Glasse, the one a *Crimsin*, and the other an *Azure*, and a Candle within either of them, those Coloured Lights would mingle and cast upon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weak *Mixture*: For white walls make Roomes more lightsome than black, &c. But the Cause of the *Confusion* in Sounds, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in Right Lines, and maketh severall *Cones*; And so there can be no Coincidence in the Eye, or Visuall Point: But Sounds that move in Oblique and Arcuate Lines, must needs encounter, and disturbe the one the other.

The sweetest and best *Harmony* is, when every *Part* or *Instrument*, is not heard by it selfe, but a Conflation of them all; Which requireth to stand some distance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smels of severall *Flowers* in the *Aire*.

The *Disposition* of the *Aire*, in other *Qualities*, except it be joyned with Sound, hath no great Operation upon Sounds: For whether the *Aire* be

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in Consort,
touching the
Mixture of
Sounds.

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lightsome or dark, hot or cold, quiet or stirring, (except it be with *Noise*) sweet-smelling, or stinking, or the like ; it importeth not much : Some petty Alteration or difference it may make.

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But *Sounds* doe disturbe and alter the one the other : Sometimes the one drowning the other, and making it not heard ; Sometimes the one jarring and discording with the other, and making a Confusion ; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

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Two *Voices* of like *lowdnesse*, will not be heard twice as farre, as one of them alone ; And two *Candles* of like light, will not make things seeme twice as farre off, as one. The Cause is profound ; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *mingle* respectively, every one with his kind ; But not in proportion, as is before demonstrated : And the reason may be, because the first *Impression*, which is from *Privative* to *Active* (As from *Silence* to *Noise*, or from *Darknesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light* to *More Light*. And the Reason of that again may be ; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

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in Confort
touching Me-
lioration of
Sounds.

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ALL *Reflexions Concurrent* do make *Sounds* Greater ; But if the Body that createth, either the Originall *Sound*, or the *Reflexion*, be clean and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished Brasse, in stead of Wood. We see that even in the Open *Aire*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth ; As in *Musick* near the *Water* ; Or in *Eccho's*.

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It hath been tryed, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry : But yet with a sweet Degree of *Sibilation*, or *Purling* ; As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) between dry and wet, become a little more Even and Smooth ; But the *Purling*, (which must needs proceed of Inequality,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet ; And the Rest of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth dry.

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In *Frosty Weather*, *Musick* within doors soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow : And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that have been kept long.

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Sound is likewise *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire* ; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly ; Making another Belly with a Knot over the Strings ; yet so, as there be Room enough for the Strings, and Room enough to play below that Belly. Triall may be also of an *Irish Harpe*, with a Concave on both Sides ; whereas it useth to have it but on one Side. The doubt may be, lest it should make too much Resounding ; whereby one Note would overtake another.

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If you sing in the Hole of a *Drum*, it maketh the *Singing* more sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums* ; And for handfomnesse and strangenesse sake, it would not be amisse to have a Curtain between the Place, where the *Drums* are, and the *Hearers*.

When

When a *Sound* is created in a *Wind-Instrument*, between the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumpet*, or *Pipe of Wood*; And again in a *Trumpet* or *Pipe of Brasse*. It were good to try *Recorders* and *Hunters Hornes of Brasse*, what the *Sound* would be.

Sounds are *meliorated* by the *Intension* of the *Sense*, where the *Common Sense* is collected most, to the *parricular Sense* of *Hearing*, and the *Sight* suspended: and therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blind Men, than to Others: And it is manifest, that between *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musick* is farre sweeter, than when one is *fully waking*.

IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learn to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would think it were a Lesson hard to learn. It is true, that it is done with time, and by little and litle, and with many *Essays* and *Proffers*: But all this dischargeth not the Wonder. It would make a Man think (though this which we shall say may seem exceeding strange) that there is some *Transmission* of *Spirits*, and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest secrets in Nature,) we shall speak in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkeys are, to *imitate* all *Motions* of Man: And in the *Catching* of *Dottrells*, we see, how the Foolish Bird playeth the Ape in *Gestures*: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some *Gesture*, or *Voice*, or *Fashion* of the other.

In *Imitation* of *Sounds*, that Man should be the *Teacher*, is no Part of the Matter; For *Birds* will learn one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have *Parrots*, that will not onely *imitate* *Voices*, but *Laughing*, *Knocking*, *Squeaking* of a *Doore* upon the *Hinges*, or of a *Cart-wheel*; And (in effect) any other *Noise* they heare.

No *Beast* can *imitate* the *Speech* of Man, but *Birds* onely; For the Ape it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of *Speech*. It is true, that I have known a *Dog*, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of Man, may be further enquired. We see that *Beasts* have those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto Man, than *Birds*. As for the *Neck*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or *Attire*, *Birds* have, may be further enquired. The *Birds* that are known to be *Speakers*, are, *Parrats*, *Pyes*, *Fayes*, *Dawes*, and *Ravens*. Of which *Parrats* have an adunque Bill, but the rest not.

But I conceive, that the Aptnesse of *Birds*, is not so much in the *Conformity* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*,

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touching the
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Hearing, and *Learning*; And *Birds* give more heed, and mark *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keep them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more.

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Labour, and *Intention* to imitate *Voyces*, doth conduce much to *Imitation*: And therefore we see, that there be certain *Pantomimi*, that will represent the voyces of *Players* of *interludes*, so to life, as if you see them not, you would think they were those *Players* themselves; And so the *Voyces* of other *Men* that they heare.

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There have been some, that could counterfeit the *Distance* of *Voyces*; (which is a *Secondary Object* of *Hearing*;) in such sort; As when they stand fast by you, you would think the *Speech* came from a farre off, in a fearfull manner. How this is done, may be further enquired. But I see no great use of it, but for Imposture, in counterfeiting Ghosts or Spirits.

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in Confort
touching the
Reflexion of
Sounds.

There be three Kindes of *Reflexions* of *Sounds*; A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath been handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speak of.

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The *Reflexion* of *Species Visible*, by *Mirroures*, you may command; Because passing in Right Lines, they may be guided to any point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not been practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already known returneth in a very narrow Room.

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The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rocks*, *Hills*, and *Bancks*; As for *Waters*, being neare, they make a *Concurrent Eccho*; but being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quicknesse, or Slownesse of the Return. But there is no doubt, but *Water* doth help the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

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It is certaine, (as hath been formerly touched,) that if you speak thorow a *Trunk*, stopped at the further end; you shall find a Blast return upon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preserveth the *Originall*, is not able to preserve the *Reflected Sound*: Besides that *Eccho's* are seldome created, but by loud *Sounds*. And therefore there is lesse hope of *Artificial Eccho's* in Aire, pent in a narrow Concave. Nevertheless it hath been tried, that one leaning over a *Well*, of 25. Fathome deep, and speaking, though but softly, (yet not so soft as a whisper,) the *Water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Issue, save where you speak, will not yeeld *Eccho's*, as *Wells* do.

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The *Eccho* commeth as the *Originall Sound* doth, in a round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercussing maketh an Angle: As against the Return of a Wall, &c. Also we see that in *Mirroures*, there is the like Angle of Incidence, from the Object to the Glasse, and from the Glasse to the Eye. And if you strike a *Ball* side-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether

ther there be any such *Resilience* in *Eccho's*, (that is, whether a Man shall hear better, if he stand aside the Body *Repercussing*, than if he stand where he speaketh, or any where in a right Line between;) may be tried. Triall likewise would be made, by Standing nearer the place of *Repercussing*, than he that speaketh; And again by Standing further off, than he that speaketh; And so knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not strongest neare hand.

There be many Places, where you shall heare a number of *Eccho's* one after another: And it is, when there is Variety of *Hills* or *Woods*, some nearer, some further off: So that the Returne from the further, being last created, will be likewise last heard.

As the *Voice* goeth round, as well towards the Back, as towards the Front of him that speaketh: So likewise doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you stand.

To make an *Eccho*, that will report, three or foure, or five Words, distinctly, it is requisite, that the Body *Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Eccho*, it choppeth with you upon the sudden. It is requisite likewise, that the *Aire* be not much *pent*. For *Aire*, at a great distance, *pent*, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the *Triall* of *Speaking* in the *Well*, though the *Well* was deep, the *Voice* came back, suddenly; And would beare the Report but of two Words.

For *Eccho's* upon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neare a Towne called *Font-Charenton*; And some Bird-bolt shot, or more, from the River of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of *Isles* of *Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against every Pillar; a Stack of Billets, above a Mans Height; which the Watermen, that bring Wood down the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it return the *Voice* thirteen severall times; And I have heard of others, that it would return sixteen times: For I was there about three of the Clock in the afternoone: And it is best, (as all other *Eccho's* are) in the Evening. It is manifest, that it is not *Eccho's* from severall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behind, you shall see the *Glasse* behind with the *Image*, within the *Glasse* before; And again, the *Glasse* before in that; and divers such *Super-Reflexions*, till the *species speciei* at last die. For it is every Return weaker, and more shady. In like manner, the *Voice* in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you speak three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of so many Returnes, upon the matter, you heare above twenty Words for three.

The like *Eccho* upon *Eccho*, but only with two Reports, hath been observed, to be, if you stand betweed a *House*, and a *Hill*, and lure towards the
Hill

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Hill. For the *House* will give a *Back Eccho* ; One taking it from the other, and the latter the weaker.

251 There are certaine *Letters*, that an *Eccho* will hardly expresse ; As *S*, for one, Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that took it to be the Work of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliver back the Devils name ; But will say, *Va'en* ; Which is as much in *French*, as *Apaze*, or *Avoid*. And thereby I did hap to find, that an *Eccho* would not return *S*, being but a Hissing and an *Interieur Sound*.

252 *Eccho's* are some more sudden, and chop againe, as soone as the *Voice* is delivered ; As hath been partly said : Others are more deliberate, that is give more Space between the *Voice*, and the *Eccho* ; which is caused by the locall Nearness, or Distance : Some will report a longer Train of Words ; And some a shorter : Some more loud (full as loud as the *Originall*, and sometimes more loud ;) And some weaker and fainter.

253 Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*, and so make the Report greater, and even a *Continued Eccho* ; which you shall find in some *Hills*, that stand encompassed, Theatre-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not think, that if a *Sound* should passe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred ; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath been handled at full ;) But it is not by Diversity of *Mediums*.

Experiments
in Confort
touching the
Consent and
Dissent be-
tween *Visibles*
and *Andibles*.

Wee have obiter, for Demonstrations sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible* , to illustrate the *Nature* of *Sounds*. But we think good now to prosecute that *Comparison* more fully.



CONSENT OF VISIBLES and Audibles.

155 Both of them spread themselves in Round, and fill a whole Floare or Orbe, unto certaine Limits : And are carried a great way. And doe languish and lessen by degrees, according to the Distance of the objects from the Sensories.

256 Both of them have the whole *Species* in every small portion of the *Aire* or *Medium*, So as the *Species* doe passe through small *Cranies*, without Confusion : As we see ordinarily in *Levels*, as to the *Eye* ; And in *Cranies*, or *Chinks*, as to the *Sound*.

257 Both of them are of a sudden and easie Generation and Delation ; And likewise perish swiftly, and suddenly ; As if you remove the *Light* ; Or touch the *Bodies* that give the *Sound*.

Both

Both of them doe receive and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

258

Both of them in their Vertue and Working, do not appeare to emit any Corporal Substance into their Mediums, or the Orbe of their Vertue; Neither again to rise or stir any evident locall Motion in their Mediums, as they passe; But only to carry certain Spirituall Species; The perfect knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

259

Both of them seeme not to generate or produce any other Effect in Nature, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

260

But *Both* of them in their owne proper Action, doe work three manifest Effects. The First, in that the Stronger species drowneth the Lesser; As the Light of the Sun, the light of a Glow-worm; The Report of an Ordnance, the Voice; The Second, in that an Object of Surcharge or Excesse destroyeth the Sense; As the Light of the Sun the Eye, a violent Sound (neare the Eare) the Hearing: The Third, in that both of them will be reverberate; As in Mirrours; And in *Eccho's*.

261

Neither of them doth destroy or hinder the Species of the other, although they encounter in the same Medium; As Light or Colour hinder not Sound; Nor è contrà.

262

Both of them affect the Sense in Living Creatures, and yeeld Objects of Pleasure and Dislike: Yet neverthelesse, the Objects of them do also (if it be well observed) affect and worke upon dead Things; Namely such, as have some Conformity with the Organs of the two Senses; As *Visibles* worke upon a Looking-glasse, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare.

263

Both of them do diversly work, as they have their Medium diversly disposed. So a Trembling Medium (as Smoak) maketh the Object seeme to tremble; and a Rising or Falling Medium (as Winds) maketh the Sounds to rise, or fall.

264

To *Both*, the Medium, which is the most Propitious and Conducibile, is Aire; For Glasse or Water, &c. are not comparable.

265

In *Both* of them, where the object is Fine and Accurate, it conduceth much to have the Sense Intentive, and Erect; Insomuch as you contract your Eye, when you would see sharply; And erect your Eare, when you would heare attentively; which in Beasts that have Eares moveable, is most manifest.

266

The Beames of Light, when they are multiplied, and conglomerate, generate Heat; which is a different Action, from the Action of Sight: And the Multiplication and Conglomeration of Sounds doth generate an extreme Rarefaction of the Aire, which is an Action materiate, differing from the Action of Sound; If it be true (which is anciently reported) that Birds, with great shouts, have fallen down.

267



DISSENTS OF VISIBLES and Audibles.

268 **T**He *Species* of *Visibles* seem to be *Emissions* of *Beames* from the *Object* seen; Almost like *Odours*, save that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to work in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *species* of *Audibles* seeme to be carried more manifestly thorow the *Aire* than the *Species* of *Visibles*: For (I conceive) that a *Contrary* strong *Wind* will not much hinder the *Sight* of *Visibles*, as it it will do the *Hearing* of *Sounds*.

270 There is one *Difference*, above all others, between *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller *Differences* doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the *Solidity* of Bodies doth not much hinder the *Sight*, so that the Bodies be cleare, and the Pores in a *Right Line*, as in *Glasse*, *CrySTALL*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*, though they be Bodies nothing so solid, hinder the *Sight*: Whereas (contrariwise) these *Porous* Bodies doe not much hinder the *Hearing*, but solid Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice, but to the *Reverberation* of *Audibles*, are required greater *Spaces*, as hath likewise been said before.

271 *Visibles* are seen further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seen.

272 *Visibles* require (generally) some *Distance* between the *Object*, and the *Eye*, to be better seen; Whereas in *Audibles*, the nearer the *Approch* of the *Sound* is to the *Sense*, the better. But in this there may be a double *Error*. The one because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all over,) excludeth the *Light*. For I have heard of a *Person* very credible, (who himselfe was cured of a *Cataract* in one of his *Eyes*,) that while the *Silver Needle* did work upon the *Sight* of his *Eye*, to remove the *Filme* of the *Cataract*, he never saw any thing more cleare or perfect, than that white *Needle*: Which (no doubt,) was, because the *Needle* was lesser than the *Pupill* of the *Eye*, and so took not the *Light* from it. The other *Error* may be, for that the *Object* of *Sight* doth strike upon the *pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the *Organ*: And so nevertheless there is some *Distance* required in both.

273 *Visibles* are swiftlier carried to the *Sense*, than *Audibles*: As appeareth in *Thunder*

Thunder and Lightning ; Flame and Report of a Peece ; Motion of the Aire in Hewing of Wood. All which have been set downe heretofore, but are proper for this *Title*.

I conceive also, that the *Species* of *Audibles*, doe hang longer in the Aire than those of *Visibles* : For although even those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres ; In *Lute-strings* filipped ; A *Fire-brand* carried along, which leaveth a Train of Light behind it ; and in the *Twilight* ; And the like : Yet I conceive that *Sounds* stay longer, because they are carried up and down with the Wind : And because of the Distance of the Time, in *Ordnance discharged*, and heard twenty Miles off.

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule *Sights* do not much offend ; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge ; And any of the *harsh Discords* in *Musick*, the Eare doth straight-ways refuse.

In *Visibles*, after great Light, if you come suddenly into the *Dark* ; Or contrariwise, out of the *Dark* into a *Glaring light*, The Eye is dazled for a time, and the *Sight* confused ; But whether any such Effect be after great *Sounds*, or after a deep *Silence*, may be better enquired. It is an old Tradition, that those that dwell near the *Catarracts* of *Nilus*, are stricken deafe : But we find no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges.

It seemeth that the *Impression* of *Colaur* is so weak, as it worketh not but by a Cone of Direct *Beames*, or Right Lines, whereof the Basis is in the Object, and the Verticall Point in the Eye ; So as there is a Corradiation and Conjunction of *Beames* ; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speak not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent ; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body* of *Light*. For when there is a Skreen between the Candle and the Eye, yet the *Light* passeth to the Paper whereon one writeth ; So that the *Light* is seen where the Body of the *Flame* is not seen ; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seen. I judge that *Sound* is of this Latter Nature ; For when two are placed on both sides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which passeth in an *Arched Line* ; But the *Sound*, which passeth above the Wall in a Right Line, begetteth the like Motion round about it, as the first did, though more weak.

ALL *Concords* and *Discords* of *Musick*, are (no doubt) *Sympathies* and *Antipathies* of *Sounds*. And so (likewise) in that *Musick*, which we call *Broken Musick*, or *Consort Musick* ; Some *Consorts* of *Instruments* are sweeter than others ; (A Thing not sufficiently yet observed :) As the *Irish Harp*, and *Base Viall* agree well : The *Recorder* and *Stringed Musick* agree well : *Organs* and the *Voice* agree well, &c. But the *Virginals* and the *Lute*, Or the *Welch-Harp* ; and *Irish-Harp* ; Or the *Voice* and *Pipes* alone, agree not so well ; But for the *Melioration* of *Musick* there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

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There

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Experiments
in Consort
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

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There is a Common Observation, that if a *Lute*, or *Viall*, be layed upon the Back, with a small Straw upon one side of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vnison* to that *String* be stricken; it will make the *String* move; Which will appeare both to the Eye, and by the *Straws* falling off. The like will be, if the *Diapason* or *Eight* to that *String* be stricken, either in the same *Lute*, or *Viall*, or in others lying by; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

280

It was devised, that a *Viall* should have a Lay of Wire Strings below, as close to the Belly as a *Lute*; And then the *Strings* of Guts mounted upon a Bridg, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musick* the better; Which, if it be to purpose, then *Sympathy* worketh as well by Report of *Sound*, as by *Motion*. But this devise I conceive to be of no use, because the upper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are never stopped. But if it should be of use at all; it must be in *Instruments* which have no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, distant the one from the other.

281

The *Experiment* of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings* to other *Instruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vnison*, whether the striking of the one would move the other, more then if it were another Accord: And so in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blown at an *Vnison*.

282

It seemeth both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath been touched before.) For as the *Sight* of the *Eye* is like a Cryfall, or Glasse, or Water; So is the *Eare* a sinuous Cave, with a hard Bone, to stop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

Experiments
in Confort
touching the
Hindring or
Helping of the
Hearing.

283

284

WHEN a Man *Tawneth*, he cannot *Heare* so well. The *Cause* is for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all Listening to attain a *Sound* a farre off, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the Motion is Outwards; and therefore, rather driveth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, we *hold the Breath*: And listening after any *Sound*, that is heard with difficulty, is a kind of *Labour*.

285

Let it be tried, for the *Help* of the *Hearing*, (and I conceive it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bignesse of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be set close to the *Eare*: And mark whether any *Sound* abroad in the open Air, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Instrument* in use to be set to the *Eare*; that *helpeth* somewhat those that are Thick of Hearing.

286

If the *Mouth* be shut Close, neverthelesse there is yeilded by the Roof of the mouth, a Murmur. Such as is used by dumbe Men: But if the *Nostrills* be likewise stopped, no such Murmur can be made; Except it be in the Bot-

tome of the Pallate towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as afore said, if the *Mouth* be stopped, passeth from the *Pallate* through the *Nostrills*.

The *Repercussion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spirituell Essence* of *Sounds*. For if it were *Corporeall*, the *Repercussing* should be created in the same manner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concur in Speaking of Words, whereof there is no such Matter in the *Returning* of them; But onely a plain Stop, and *Repercussion*.

Experimentes
in Consort,
touching the
Spirituell and
Fine Nature
of *Sounds*.

287

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath been well refuted by the Ancients. For it is true, that Seales make excellent Impressions: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be Impressions.

288

All *Sounds* are suddenly made, and do suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quaverings, and Warblings in Lutes, and Pipes, are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserveth more Admiration. As for Example; If a Man stand in the Middle of a Field, and speak aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the *Aire*; And this shall be done in the Space of lesse than a Minute.

289

The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; for that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first; But then other Grosse and more Materiate Qualities of the *Aire* straight-wayes suffocate it; Like unto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

290

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appear) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And because it is a *Vertue* which may be called *Incorporeal*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first Centuries,) to make a Patterne or President of an

Exact Inquisition; And we shall doe the like hereafter in some other Subjects which require it. For we desire that Men should learne and perceive, how severe a Thing the true *Inquisition* of Nature is; And should accustome themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World, and not reduce the World to the Narrowness of their Mindes.

Experiment
Solitary
touching the
Orient Colours,
in Dissolution
of Metalls.

291

Metalls give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent *Yellow*; *Quick-Silver* an excellent *Greene*; *Tinne* giveth an excellent *Azure*: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And again to retain Part of their principall Spirit; Which two Things, (Equall Posture, and Quick Spirits) are required chiefly, to make Colours lightsome.

Experiment
Solitary touch-
ing Prolonga-
tion of Life.

292

IT conduceth unto *Long Life*, and to the more Placide Motion of the Spirits, which thereby do lesse prey and consume the Juyce of the Body; Either that *Mens Actions be free and Voluntary*; that nothing be done *Inviâ Minervâ*, but *Secundum genium*: Or on the other side, that the *Actions of Men be full of Regulation, and Commands within themselves*: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as do continually enjoyne themselves.

Experiment
Solitary tou-
ching Appetite
of Vnion in
Bodies.

393

IT is certain, that in all Bodies, there is an *Appetite of Vnion*, and Evitation of Solution of Continuity: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weak. We see in *Liquours*, the *Thredding* of them in *Stilllicides*, (as hath been said;) The *Falling* of them in *Round Drops*, (which is the form of *Vnion*;) And the *Staying* of them for a little time, in *Bubbles* and *Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* between the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly stick and continue to themselves; And therefore they roape, and draw themselves in Threds; as we see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: and that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantity, cleaveth to any Thing that is *Solide*; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be *Clammy*, and *Cleaving*, are such, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a *Forrain Body*, than in preserving their own *Consistence*; And which have little predominance in *Drought* or *Moisture*.

Time

Time, and Heat, are Fellows in many Effects. Heat drieth Bodies, that do easily expire ; As Parchment, Leaves, Roots, Clay, &c. And, so doth Time or Age arefie ; As in the same Bodies, &c. Heat dissolveth and melteth Bodies, that keep in their Spirits ; As in divers *Liquefactions* ; And so doth Time, in some Bodies of a softer Consistence: As is manifest in Honey, which by Age waxeth more liquid ; And the like in Sugar ; And so in old Oyle, which is ever more cleare and more hot in Medicinable use. Heat causeth the Spirits to search some Issue out of the Body ; as in the *Volatility* of Metals ; And so doth Time ; As in the *Rust* of Metals. But generally Heat doth that in small time, which Age doth in long.

Experiment
Solitary touch-
ing the like
Operations of
Heat, and Time.
294

Some Things which passe the Fire are softest at first, and by Time grow hard ; As the Crumme of Bread. Some are harder when they come from the Fire, and afterwards give again, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The Cause is, for that in those things which wax Hard with Time, the Work of the Fire is a Kind of *Melting* : And in those that wax soft with Time, (contrariwise,) the work of the Fire is a Kind of *Baking* ; And whatsoever the Fire baketh, Time doth in some degree dissolve.

Experiment
Solitary tou-
ching the dis-
fering Operati-
ons of Fire,
and Time.
295

Motions passe from one Man to another, not so much by Exciting I-magination ; as by Invitation ; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning* ; and *Stretching* do passe from Man to Man ; For that that causeth *Gaping* or *Stretching* is, when the Spirits are a little Heavy, by any Vapour, or the like. For then they strive (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleep ; Or before the Fit of an Ague ; doe use to Yawne and Stretch ; And doe likewise yeeld a *Noyse* or *Sound*, which is an *Interjection* of *Expulsion* : So that if another be apt and prepared to do the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary, tou-
ching Motions
by Imitation.
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There be some knowne *Diseases* that are *Infectious* ; And others that are not. Those that are *Infectious*, are ; First, such as are chiefly in the *Spirits*, and not so much in the *Humours* ; And therefore passe easily from Body to Body : Such are *Pestilences*, *Lippitudes* : and such like. Secondly, such as *Taint* the *Breath* ; Which we see passeth manifestly from Man to Man ; And not invisible, as the *Affects* of the *Spirits* do : Such are *Consumptions* of the *Lungs* &c. Thirdly, such as come forth to the *Skinne* ; And therefore taint the *Aire*, or the *Body Adjacent* ; Especially if they consist in an Unctuous Substance, not apt to dissipate ; Such are *Scabs*, and *Leprosie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations* : And therefore they never infect, but by *Touch* onely ; And such a *Touch* also, as commeth within the *Epidermis* ; As the the venome of the *French Pox* ; And the *Biting* of a *Mad Dog*.

Experiment
Solitary
touching Infe-
ctious Diseases.
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Most *Powders* grow more Close and Coherent by *Mixture* of *Water* than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body ; as *Meale*, &c. The Reason is the Congruity of Bodies ; which if it be more, maketh a Per-fecter Imbibition, and Incorporation ; Which in most *Powders* is more be-tween *Them* and *Water*, then between *Them* and *Oyle* : But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment
Solitary tou-
ching the In-
corporation of
Powders, and
Liquours.
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Experiments
Solitary touch-
ing Ex-
ercise of the
Body.

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Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the *Body* be *Hot*, and *Void* of *Superfluous Moistures*, too much *Motion* hurteth: And it is an *Errour* in *Physitians*, to call too much upon *Exercise*. Likewise men ought to beware, that they use not *Exercise* and a *Spare Diet* both: but if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the *Parts* more forcibly. Secondly, that it helpeth to *Excerne* by *Sweat*, and so maketh the *Parts* assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solid* and *Compact*; And so lesse apt to be *Consumed* and *Depredated* by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more *Hot* and *Predatory*. Secondly, that it doth absorb likewise, and attenuate too much the *Moisture* of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in *Rest*. But generally *Exercise*, if it be much, is no *Friend* to *Prolongation* of *Life*; Which is one *Cause*, why *Women* live longer then *Men*, because they stirre lesse.

Experiments
Solitary, touch-
ing Meats
that induce
Society.

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Some *Food* we may use *long*, and *much*, without *Glutting*; As *Bread*, *Flesh* that is not *fat*, or *ranck*, &c. Some other, (though pleasant,) *Glutteth* sooner; As *Sweet Meats*, *Fat Meats*, &c. The *Cause* is, for that *Appetite* consisteth in the *Emptinesse* of the *Mouth* of the *Stomack*, Or possessing it with somewhat that is *Astringent*; And therefore *Cold* and *Dry*. But things that are *Sweet* and *Fat*, are more *Filling*: And doe swimme and hang more about the *Mouth* of the *Stomack*; And goe not downe so speedily: And again turn sooner to *Choler*, which is *hot*, and ever abateth the *Appetite*. We see also, that another *Cause* of *Society*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the reason of the *Distaste* of *Society*, and of the *Pleasure* in *Novelty*; and to distinguish not onely in *Meats* and *Drinks*, but also in *Motions*, *Loves*, *Company*, *Delights*, *Studies*, what they be that *Custome* maketh more greatfull; And what more tedious; were a large *Field*. But for *Meats*, the *Cause* is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a *Relish* by former use. And (generally) it is a *Rule*, that whatsoever is somewhat *Ingrate* at first, is made *Gratefull* by *Custome*; But whatsoever is too *Pleasing* at first, groweth quickly to *satiare*.

N A-



NATVRALL HISTORIE.

IV. Century.



ACCCELERATION of *Time*, in *Works of Nature*, may well bee esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating of the Time*, is next to the *Creating of the Matter*. We will now therefore proceed to the *Enquiry of it*: And for *Acceleration of Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thick and troubled; As *Must*, *Wort*, *Juyces of Fruits*, or *Hearbs* expressed, &c. And by *Time*, they settle, and Clarifie. But to make them cleare, before the *Time*, is a great work; For it is a *Spur to Nature*, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, speedily; But to know the *Meanes of Accelerating Clarification*, we must first know the *Causes of Clarification*. The first Cause is, by the *Separation of the Grosser Parts of the Liquour*, from the *Finer*. The second, by the *Equall Distribution of the Spirits of the Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Cleare and Untroubled. The third, by the *Refining the Spirit it Selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

First, for *Separation*; It is wrought by *Weight*; As in the ordinary *Residence or Settlement of Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or down, which is a kind of *Attraction*;) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which *Viscous Body* (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*. Secondly,

Experiments
in Consort
touching the
Clarification of
Liquours, and
the Accelerating
thereof.

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Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

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Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue* to *attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trials*.

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It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) whereby it will *Clarifie* much the sooner: For the *Lees*, though they keep the *Drink* in Heart, and make it lasting; yet withal they cast up some Spissitude: And this *Instance* is to be referred to *Separation*.

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On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will work; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessel of *New Beere*; And take another Vessel of *New Beere*, and Rack the one Vessel from the *Lees*, and powre the *Lees* of the Racked Vessel into the unracked Vessel, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

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Take *New Beere*, and put in some Quantity of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Groffer Parts, whereby they may fall down into *Lees*. And this *Instance* again is referred to *Separation*.

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The longer *Malt*, or *Hearbs*, or the like, are Infused in *Liquour*, the more thick and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*; the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or setteth at the Bottome. And therefore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

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Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost to the very Neck: Let the Bottle be well stopped, lest it fly out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beer* set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

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Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheel-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some *Aire*; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drink* into another Bottle, Stopped close, after the usuall manner; For if it stay with much *Aire* in it, the *Drink* will pall; neither will it settle so perfectly in all the Parts. Let it stand some 24 houres: Then take it, and put it again into a *Bottle* with *Aire*, *ut supra*: And thence into a *Bottle Stopped*, *ut supra*: And so repeat the same *Operation* for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drink* pall. It were good also, to try it in a *Bottle* with a little *Aire* below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*;) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New-Beere*, and stirred with it: For it may be that the *Grosser Part* of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath been said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

The *Accelerating* of *Maturation* we will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Ulcers*. This last we referre to another Place, where we shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metals*, &c. whereof we will speak as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinity with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is, (whereof we spake before;) But then note, that an Extreme *Clarification* doth spread the *Spirits* so Smooth, as they become Dull, and the *Drink* dead, which ought to have a little Flouing. And therefore all your Clear *Amber Drink* is flat.

We see the *Degrees* of *Maturation* of *Drinks*; In *Must*; In *Wine*, as it is drunk; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well *Congregated*; *Wine* hath them well united; so as they make the *Parts* somewhat more Oylie: *Vinegar* hath them *Congregated*; but more Jeune, and in smaller Quantity; The greatest and finest Spirit and Part being exhaled: For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sunne. And therefore *Vinegar* will not burne; For that much of the Finer Parts is exhaled.

The *Refreshing* and *Quickning* of *Drink* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So we see that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. We see also *Bottelling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirteth when the Stopple is taken forth) maketh the *Drink* more quick and windy. A *Pan* of *Coales* in the *Cellar* doth likewise good, and maketh the *Drink* work againe. *New Drink* put to *Drink* that is *Dead*, provoketh it to work againe: Nay, which is more, (as some affirme,) A *Brewing* of *New Beere*, set by *Old Beere*, maketh it work again. It were good also to *Enforce* the *Spirits* by some *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water*; which, as it seemeth, getteth downe the *Whey*.

It is tried, that the *Burying* of *Bottles* of *Drink* well stopped, either in dry *Earth*, a good depth; Or in the *Bottom* of a *Well* within *Water*; And best of all the *Hanging* of them in a *deep Well* somewhat above the *Water*, for some fortnights space, is an excellent *Meanes* of making *Drink* fresh, and quick

Experiments in Consort, touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

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quick : for the *Cold* doth not cause any Exhaling of the *Spirits* at all ; As *Heat* doth, though it rarifieth the rest that remaine : But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation* of *Fruits*, It is wrought by the *Calling forth* of the *Spirits* of the *Body* outward, and so *Spreading* them more *smoothly* : And likewise by *Digesting*, in some degree, the *Grosser Parts* : And this is Effected, by *Heat* ; *Motion* ; *Attraction* ; And by a *Rudiment* of *Putrefaction* : For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw* ; In *Hay* ; In *Flower* ; In *Chalk* ; In *Lime* ; Covered over with *Onions* ; Covered over with *Crabs* ; Closed up in *Wax* ; Shut in a *Box*, &c. There was also an *Apple* hanged up in *Smoak* : Of all which the *Experiment* sorted in this Manner.

318 After a Moneths Space, the *Apple* Enclosed in *Wax*, was as *Greene* and *Fresh* as at the first Putting in, and the *Kernells* continued *White*. The *Cause* is, for that all *Exclusion* of *Open Aire*, (which is ever *Predatory*) maintaineth the *Body* in his first *Freshness*, and *Moisture* : But the *Inconvenience* is, that it tasteth a little of the *Wax* : Which, I suppose, in a *Pomgranate*, or some such thick coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *smoak*, turned like an Old Mellow *Apple* Wrinkled, Dry, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (for we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth, And *Pigs feet*, made of *Quarters* of *Wardens*, scorch and have a skin of *Cole*) doth Mellow, and not Adure : The *Smoak* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Peares*, and *Prunes*, in the *Oven*, and *Removing* of them often as they begin to *Sweat*, there is a like *Operation* ; But that is with a farre more Intense degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Ashes*, were well *Matured*, As appeared both in their *Yellowness*, and *Sweetness*. The *Cause* is, for that that *Degree of Heat* which is in *Lime* and *Ashes*, (being a smothering *Heat*) is of all the rest most Proper ; for it doth neither *Liquefie*, nor *Arefie* ; And that is true *Maturation*. Note that the Taste of those *Apples* was good ; And therefore it is the *Experiment* fittest for Use.

321 The *Apples* Covered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat* ; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*, which taketh away *Hardness*. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turn the *Apples* first upon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster ; *Botrus contra Botrum citius maturescit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other ; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smothering, and which drieth not.

323 The *Apple* in the *Close Box*, was ripened also : The *Cause* is, for that all *Aire*, kept close, hath a degree of *Warmth* : As we see in *Wool*, *Fur*, *Plush*, &c. Note that all these were Compared with another *Apple*, of the same kind, that lay of it Selfe : And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it upon a Table hard : We see in Common Experience, that the *Rowling* doth Soften and Sweeten

Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the *Harrishnesse*: But this *Hard Rowling* is between *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and like unto the *Naturall Maturation*.

Take an *Apple*; and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuity* will not hasten a *Maturation*: We see that where a *Wasse*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

Take an *Apple*, &c. and prick it with a *Pin* full of *Holes*, not deep, and smear it a little with *Sack*, or *Cinnamon Water*, or *Spirit of wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, set another of the same *Fruits* by, to Compare them: And try them, by their *Yellownesse*, and by their *Sweetnesse*.

The World hath been much abused by the Opinion of *Making of Gold*: The *Work* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of *Errour* and *Imposture*; And in the Theory, full of *unfound Imaginations*. For to say, that *Nature* hath an Intention to make all *Metals Gold*: And that, if she were delivered from *Impediments*, shee would performe her owne work: And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*: And that a little *Quantity* of the *Medicine*, in the *Work of Projection*, will turne a *Sea* of the *Baser Metall* into *Gold*, by *Multipling*: All these are but *dreames*: And so are many other *Grounds of Alchymy*. And to help the Matter, the *Alchymists* call in likewise many *Vanities*, out of *Astrology*: *Naturall Magick*: *Superstitious Interpretations of Scriptures*: *Auricular Traditions*: *Faigned Testimonies of Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But we, when we shall come to handle the *Version* and *Transmutation* of *Bodies*: And the *Experiments* concerning *Metalls*, and *Mineralls*: will lay open the true *Wayes* and *Passages* of *Nature*, which may lead to this great Effect. And we commend the wit of the *Chineses*, who despaire of *Making of Gold*, but are Mad upon the *Making of Silver*: For certaine it is, that it is more difficult to make *Gold*, (which is the most *Ponderous* and *Materiate* amongst *Metalls*) of other *Metalls*, lesse *Ponderous*, and lesse *Materiate*: than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*: Both which are more *Ponderous* than *Silver*: So that they need rather a further

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Solitary touch-
ing the Ma-
king of Gold.

ther Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturati-on*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby turning some of them into *Gold*: For we conceive indeed, that a perfect good *Concoction*, or *Disgestion*, or *Maturati-on* of some *Metalls*, will produce *Gold*. And here wee call to mind, that we knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by undertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Over-fired the Work: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that should carry a Temperate and Equall Heat: And that it was the Work of many Monthes. The Device of the Lamp was folly; But the Over-firing now used; And the Equall Heat to be required; And the making it a Work of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be used a *Temperate Heat*; For they are ever *Temperate Heats* that *Disgest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits* and *Liquours*, which will not work at all upon *Metalls*. The Second is, that the *Spirit* of the *Metall* be quickned, and the *Tangible Parts* opened: For without those two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to digest the parts. The Third is, that the *Spirits* doe spread themselves Even, and move not subsultorily; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as Equall as may be. The Fourth is, that no Part of the *Spirit* be emitted, but detained. For if there be *Emission* of *Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire: And partly by the closenesse of the Vessell. The Fift is, that there bee Choice made of the likeliest and best prepared *Metall*, for the *Version*: For that will facilitate the Work. The Sixth is, that you give Time enough for the Work: Not to prolong Hopes (as the *Alchymists* doe:) but indeed to give *Nature* a convenient Space to work in. These Principles are most certaine, and true: We

We will now derive a direction of *Trial* out of them, Which may (perhaps) by further Meditation, be improv'd,

Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such as may keep the *Metall* perpetually Moulten, and no more; For that above all importeth to the Work. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth most with *Gold*; Put in also, with the *Silver*, a Tenth Part of *Quick-Silver*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Sixe Moneths*, at the least. I wish also, that there be, at sometimes, an Injection of some *Oyled Substance*; Such as they use in the Recovering of *Gold*, which by Vexing with Separations hath been made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maine Work. For *Gold* (as we see) is the Closest (and therefore the Heaviest) of *Metals*: And is likewise the most Flexible, and Tenible. Note, that to thinke to make *Gold* of *Quick-silver*, because it is the heaviest, is a Thing not to be hoped; For *Quick-silver* will not endure the Manage of the *Fire*. Next to *Silver*, I thinke *Copper* were fittest to bee the Materiall.

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Gold hath these *Natures*: *Greatnesse of Weight*; *Closenesse of Parts*; *Fixation*; *Pliantnesse*, or *Softnesse*; *Immunity from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the Severall *Natures* before rehearsed, and the *Axiomes* concerning the same. For if a man can make a *Metall*, that hath all these *Properties*, Let men dispute, whether it be *Gold*, or no?

Experiment Solitary, touching the Nature of Gold.

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The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Universall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they Two, are as *Natures* two *Termes* or *Boundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to Get forth, and Congregate with the *Aire*, and to enjoy the *Sunnebeames*. The *Getting forth*, or *Spreading* of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the *Spirits* be detained within the Body, and move more violently, there followeth *Colliquation*; As in *Metals*, &c. If more Mildely, there followeth *Disgestion*, or *Maturation*; As in *Drinckes*, and *Fruits*. If the *Spirits* be not meerly Detained, but Protrude a little, and that Motion be Confused, and inordinate, there followeth *Putrefaction*; Which ever dissolveth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metals*. But if that Motion be in a certain Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures* Perfect. But if the *Spirits* issue out of

Experiments in Consort, touching the Enducing and Accelerating of Putrefaction.

the Body, there followeth *Desiccation, Induration, Consumption, &c.* As in *Bricke, evaporation of Bodies Liquid, &c.*

329 The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding* some *Crude* or *Watry Moisture*; As in *Wetting* of any *Flesh, Fruit, Wood*, with *Water, &c.* For contrariwise *Unctuous* and *Oily Substances* preserve.

330 The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is sound: Or when *Dung* (which is a Substance already Putrified) is added to other Bodies. And this is also notably seene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

331 The Third is, by *Closenesse*, and *Stopping*, which *detaineth* the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to seeke *Issue*; As in *Corne*, and *Cloaths*, which waxe *Musty*; and therefore *Open Aire*, (which they call *Aër perflabilis*) doth preserve: And this doth appeare more evidently in *Agues*, which come (most of them,) of *Obstructions*, and *Penning* the *Humours*, which thereupon *Putrifie*.

332 The Fourth is, by *Solution of Continuity*; As we see an *Apple* will rot sooner, if it be *Cut* or *Pierced*; And so will *Wood, &c.* And so the *Flesh* of *Creatures* alive, where they have received any *Wound*.

333 The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preserve the *Consistence* of the *Body*; So that when their *Government* is dissolved, every *Part* returneth to his *Nature*, or *Homogeny*. And this appeareth in *Urine*, and *Blood*, when they coole, and thereby break; It appeareth also in the *Gangrene*, or *Mortification* of *Flesh*, either by *Opiates*, or by *Intense Colds*. I conceive also the same Effect is in *Pestilences*, for that the *Malignity* of the *Infecting Vapour*, daunteth the *Principall Spirits*, and maketh them *flee*, and leave their *Regiment*; And then the *Humours, Flesh*, and *Secondary Spirits*, doe dissolve, and breake, as in an *Anarchy*.

334 The Sixth is, when a *Forraine Spirit*, *Stronger* and *more Eager* than the *Spirit of the Body*, *entreth* the *Body*; As in the *Stinging* of *Serpents*. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* itself, *Congregate* too much; As upon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits* coming of *Putrefaction* of *Humours* in *Agues, &c.* Which may be counted as *Forraine Spirits*; though they be bred within the *Body*, doe *Extinguish* and *Suffocate* the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by such a *Weak Degree of Heat*, as setteth the *Spirits* in a *little Motion*, but is not able, either to *digest* the *Parts*, or to *Issue* the *Spirits*; As is seene in *Flesh* kept in a *Room* that is not *Coole*; Whereas in a *Coole* and *Wet Larder* it will keep longer. And we see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such *Soft Heats*; As the *Hatching* of *Egges*; The *Heat* of the *Wombe, &c.*

336 The Eighth is, by the *Releasing* of the *Spirits*; which before were close kept by the *Solidnesse* of their *Coverture*, and thereby their *Appetite* of *Issuing* checked; As in the *Artificiall Rusts* induced by strong *Waters*, in *Iron, Lead, &c.* And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softneth the *Crust*, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange* of *Heat* and *Cold*, or *Wet* and *Dry*; As we see in the *Mouldring* of *Earth* in *Frosts*, and *Sunne*; And in the more hasty *Rotting* of *Wood*, that is sometimes wet, sometimes dry.

The Tenth is, by *Time*, and the *Work and Procedure of the Spirits themselves*; which cannot keep their Station; Especially if they be left to themselves, And there be not Agitation or Locall Motion. As we see in Corn not stirred; And Mens Bodies not exercised.

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All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenge*s, and *Limmons*; which *Moulds* afterwards turn into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrifie totally, it will cast up a *Mother* in the Top; As the *Mothers* of *Distilled Waters*.

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Mosse is a Kinde of *Mould*, of the Earth and Trees. But it may be better sorted as a *Rudiment of Germination*; To which we referre it.

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It is an *Enquirie* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying* of *Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions* of the *Bodies* of *Men*, and *Living Creatures* (as in *Agues*, *Wormes*, *Consumptions* of the *Lungs*, *Impostumes*, and *Ulcers* both *Inwards* and *outwards*) they are a great *Part* of *Physicke*, and *Surgery*; And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinal Experiments* of all Sorts. Of the rest we will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath been said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the *Removing* that, which caused *Putrefaction*, doth *Prevent* and *Avoid Putrefaction*.

Experiments
in Consort,
touching Pro-
hibiting and
Preventing
Putrefaction.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so we see that *Meat* and *Drink* will last longer, *Unputrified*, or *Unfowred*, in *Winter*, than in *Summer*: And we see that *Flowers*, and *Fruits*, put in *Conservatories* of *Snow*, keep fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

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The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of *Oile of Vitrioll*, will keep *Fresh Water* long from *Putrifying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same *Meanes* that *Cold* doth.

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The Third is, the *Excluding* of the *Aire*; And again, the *Exposing* to the *Aire*: For these *Contraries*, (as it commeth often to passe,) work the same Effect, according to the Nature of the Subject-Matter. So we see, that *Beere*, or *Wine*, in *Bottles* close stopped, last long; That the *Garners* under *Ground* keepe *Corne* longer than those above *Ground*; And that *Fruit* closed in *Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keep more fresh: And *Liquors*, *Drinks*, and *Juyces*, with a little *Oyle* cast on the Top, keep fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed *Moaths*, and *Mould*; and the *Diversitie* is, that in *Bodies* that

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that need *Detention of Spirits*, the *Exclusion of the Aire* doth good; As in *Drinckes*, and *Corne*: But in *Bodies* that need *Emission of Spirits* to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

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The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the *Subtill Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we see that Turning over of *Corne* in a *Garner*; Or Letting it runne like an *Houre-glasse*, from an upper Room into a Lower, doth keep it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings; (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

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The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*, For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radical Moisture* is onely kept in,) putteth back *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; or dried in the hot Sunne, for a small time, keepe best. For the *Emission of the Loose and Adventitious Moisture*, doth betray the *Radical Moisture*; And carryeth it out for Company.

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The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserveth, and a *Weake or Faint Spirit* disposeth to *Corruption*. So we finde that Salt water corrupteth not so soon as Fresh: And Salting of Oysters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy Souring. So we see that *Strong Beere* will last longer than Small; And all Things, that are Hot and Aromaticall, doe helpe to Preserve Liquours, or Powders, &c. Which they doe, as well by Strengthening the *Spirits*, as by Soaking out the loose *Moisture*.

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The Seventh is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oily. So we see Distilled Waters will last longer than Raw waters; And Things that have passed the Fire, doe last longer than those that have not passed the Fire; as Dried Peares, &c.

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The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and Watry Moisture*; Not onely for the Reason before given, that it provoketh the *Radical Moisture* to come forth with it; But because being detained in the Body, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming of dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

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The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are left apt to *Putrefie*; the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Juyces*.

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The Tenth is, the *Commixture of somewhat that is Drie*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to putrefie: And therefore *Smoake* preserveth *Flesh*; As we see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beece*, &c.

The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve Bodies, longer than other *Aires*, seemeth to Me Probable; For that the *Blowne Aires*, being Over-charged and Compressed, will hardly receive the Exhaling of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whercinto Flesh was put, and likewise a Flower, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather further *Putrefaction*: The way were therefore, to blow strongly, with a Paire of Bellows, into a Hog-head, putting into the Hog-head (before) that which you would have preserved; And in the instant that you withdraw the Bellows, stop the Hole close.

THE Experiment of Wood that *Shineth* in the *Darke*, we have diligently driven, and pursued: The rather, for that of all Things, that give Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth only while it is in *Scraping*; And *Salt-water* while it is in *Dashing*; *Glo-wormes* have their *Shining* while they live, or a little after; Onely *Scales* of *Fishes* (Putrified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorted thus. 1. The *Shining* is in some *Peeces* more *Bright*, in some more *Dimme*; but the most *Bright* of all doth not attaine to the Light of a *Glo-worme*. 2. The *Woods* that have been tried to shine, are chiefly *Sallow*, and *Willow*; Also the *Ash*, and *Hastle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Daylight, is in some *Peeces* *White*, in some *Peeces* inclining to *Red*; Which in the Country they call the *White*, and *Red Carret*. 5. The Part that *Shineth*, is, (for the most Part) somewhat *Soft*, and *Moist* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a *Crosse*, or into *Beads*, &c. But you must not look to have an Image, or the like, in any Thing that is *Lightsome*; For even a face in *Iron* red Hot will not be seen, the Light confounding the small differences of *Lightsome* and *Darksome*, which shew the figure. 6. There was the *Shining Part* pared off, till you came to that, that did not Shine; But within two *Dayes* the *Part Contiguous* began also to *Shine*, being laid abroad in the *Dew*; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead *Wood* of like kinde, that was *Laid abroad*, which *Shined* not at the first; But after a *Nights* lying abroad began to *Shine*. 8. There was other *Wood*, that did *First Shine*; And being laid drie in the *House*, within five or six *dayes*, *Lost* the *Shining*; And laid abroad again, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a *Seven night*, lost their *Shining*; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring* of *Holes*, in that kinde of *Wood*, and then laying it abroad, seemeth to conduce to make it *Shine*: The Cause is, for that all *Solution* of *Continuity* doth help on *Putrefaction*, as was touched before. 11. No *Wood* hath been yet tried to *Shine*, that was cut *downe alive*, but such as was *Rooted*, both in *Stocke*, and *Root*, while it grew. 12. Part of the *Wood* that *Shined*, was steeped in *Oyle*, and retained the *Shining* a *Fortnight*. 13. The like succeeded in some steeped in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be laid abroad every *Night*, and taken in and *Sprinkled* with *Water* in the *Day*, is not yet tried. 15. *Triall* was made of laying it abroad in *Frostie* weather, which hurt it not. 16. There was a great *Peece* of a *Root*, which did shine, and the *Shining Part* was Cut off, till no more Shined;

Experiment
Solitary touching Wood
Shining in the
Dark.

Shined; Yet after two Nights, though it were kept in a drie Room, it got a *Shining*.

Experiment
Solitary, touch-
ing the
Acceleration
of Birth.

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THe *Bringing forth* of *Living Creatures* may be *Accelerated* in two *Respects*: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or *Putting it downe*: whereof the *Former* is good, and argueth *Strength*; The *Latter* is ill, and commeth by *Accident* or *Disease*; And therefore the *Ancient Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is *Fabulous*; Which is, that in the *Eighth Moneth*, should be the returne of the *Raigne* of the *Planet Saturne*; which (as they say) is a *Planet Maligne*; whereas in the *Seventh* is the *Raigne* of the *Moone*, which is a *Planet Propitious*. But the true *Cause* is, for that where there is so great a *Prevention* of the *Ordinary time*, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *indisposition* of the *Mother*.

Experiment
Solitary, touch-
ing the
Acceleration
of Growth and
Stature.

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TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plenty* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the *Childe Corpulent*; And *Growing in Breadth*, rather than in *Height*. And you may take an *Experiment* from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore *Children* in *Dayrie Countries* doe waxe more tall, than where they feed more upon *Bread*, and *Flesh*. There is also a received *Tale*; That *boyling* of *Daisie Roots* in *Milke* (which it is certaine are great *Driers*) will make *Dogs* little. But so much is true, that an *Over-Drie Nourishment* in *Childhood* putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that *Attenuateth* the *Juyce*, and furthereth the *Motion* of the *Spirits*, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their *Feeding* upon *Cardamon*; which (he saith) made them grow better, and be of a more *Active Habit*. *Cardamon* is in *Latine Nasturtium*; And with us *Water-Cresses*; Which, it is certaine, is an *Herbe*, that whilest it is young, is *Friendly* to *Life*. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much *Going to Schoole*, where they sit so much, hindreth the *Growth* of *Children*; whereas *Country-People*, that goe not to *Schoole*, are commonly of better *Stature*. And againe, Men must beware how they give *Children*, any thing that is *Cold* in *Operation*; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath been tried, that a *Whelp*, that hath been fed with *Nitre* in *Milke*, hath become very little, but extream lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an *Excellent Medicine*, in *Strength* of *yeares*, for *Prolongation* of *Life*; yet it is, in *Children* and young *Creatures*, an *Enemy* to *Growth*: And all for the same *Reason*; For *Heat* is requisite to *Growth*: But after a *Man* is come to his *Middle Age*, *Heat* consumeth the *Spirits*; which the *Coldnesse* of the *Spirit* of *Nitre* doth helpe to condense, and correct.

Experiment
in Confort,
touching Sul-
phur and Mer-
cury, two of
Paracelsus
Principles.

There bee two *Great Families* of *Things*; You may terme them by severall *Names*; *Sulphureous* and *Mercureall*, which are the *Chymists Words*: (For as for their *Sal*, which is their *Third Principle*,

Principle, it is a Compound of the other two ;) *Inflammable*, and *Not Inflammable* ; *Mature* and *Crude* ; *Oily* and *Watry*. For wee see that in *Subterrancies* there are , as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury* ; In *Vegetables* , and *Living Creatures* there is *Water* and *Oile* : In the *Inferiour* Order of *Pneumatics* there is *Aire* and *Flame* : And in the *Superiour* , there is the *Body* of the *Starre* , and the *Pure Sky*. And these *Paires*, though they bee unlike in the *Primitive Differences* of *Matter*, yet they seeme to have many *Consents* : For *Mercury* and *Sulphure* are principall *Materials* of *Metals* ; *Water* and *Oyle*, are principall *Materials* of *Vegetables*, and *Animals* ; And seeme to differ but in *Maturation*, or *Concoction* : *Flame* (in *Vulgar Opinion*) is but *Aire Incensed* ; And they both have *Quicknesse* of *Motion*, and *Facilitie* of *Cession*, much alike. And the *Interstellar Sky*, (though the *Opinion* be vain, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much *Affinity* with the *Starre*, that there is a *Rotation* of that, as well as of the *Starre*. Therefore, it is one of greatest *Magnalia Naturæ*, to turne *Water* or *Watry Iuyce* into *Oile* or *Oily Iuyce* : Greater in *Nature*, than to turne *Silver*, or *Quick-Silver*, into *Gold*.

The *Instances* we have, wherein *Crude* and *Watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water* ; which mingled by the helpe of the *Sunne*, gather a *Nitrous Fatnesse*, more than either of them have severally ; As we see, in that they put forth *Plants*, which need both *Juyces*.

The *Second* is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures* ; Whereof *Plants* turne the *Juyce* of meer *Water* and *Earth*, into a great deale of *Oily Matter* : *Living Creatures*, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they *Assimilate* also in a *Measure* their *Drink* of *Water*, &c. But these two *Wayes* of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many *Passages*, and *Percolations*, and by long *Continuance* of soft *Heats*, and by *Circuits* of *Time*.

The *Third* is in the *Inception* of *Putrefaction* ; As in *Water Corrupted* ; And the *Mothers* of *Waters Distilled* ; Both which have a kinde of *Fatness*, or *Oyle*.

The *Fourth* is in the *Dulcoration* of some *Metals* ; As *Saccharum Saturni*, &c.

The *Intension* of *Version* of *Water* into a more *Oily Substance*, is by *Disgestion* ; For *Oile* is almost *Nothing* else but *Water Digested* ; And this *Disgestion* is principally by *Heat* ; Which *Heat* must be either *Outward*, or *Inward* : Againc, it may be by *Provocation*, or *Excitation* ; Which is caused by the *Mingling* of *Bodies* already *Oily*, or *Digested* ; For they will somewhat *Communicate* their *Nature* with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Digested* ; As in *Plants*, and *Living Creatures*, whose *Nourishment* is farre more *Crude* than their *Bodies* :

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dies : But this *Disgestion* is by a great *Compasse*, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste ; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title of Version of Bodies* ; And likewise to the *Title of the First Congregations of Matter* ; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment
Solitarie, tou-
ching *Chame-*
leons.

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A *Chamelion* is a Creature about the Bignesse of an Ordinary *Lizard* ; His Head unproportionably bigge ; His eyes great : He moveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth : His Backe crooked ; His Skinne spotted with little Tumours, lesse Eminent nearer the Belly ; His Taile slender, and long : On each Foot he hath five Fingers ; three on the Outside, and two on the Inside ; His Tongue of a marvellous Length in respect of his Body, and hollow at the end, which he will launch out to prey upon *Flies*. Of Colour Green and of a dusky Yellow, brighter and whiter towards the Belly ; Yet spotted with Blew, White, and Red. If he be laid upon Green, the Green predominateth ; If upon Yellow, the Yellow ; Not so if he be laid upon Blew, or Red, or White ; Only the Greene Spots receive a more Orient Lustre ; Laid upon Blacke, hee looketh all Blacke, though not without a Mixture of Greene. He feedeth not only upon Aire, (though that be his principall Sustenance ;) For sometimes he taketh *Flies*, as was said, Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire ; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes ; Which they open commonly against the Rayes of the Sunne. They have a foolish Tradition in *Magick*, that if a *Chameleon* be burnt upon the Top of an House, it will raise a Tempest, Supposing (according to their vain Dreams of *Sympathies*) because he nourisheth with Aire, his Body should have great vertue to make Impression upou the Aire.

Experiment
Solitary tou-
ching *Subter-*
rany Fires.

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IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions of Flames* out of *Plaines* ; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pumice, as *Mountaine Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earthquakes* which cast *Flame*. There be also some *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choaked, as not able to remove the *Stone*, it is *Heat* rather than *Flame* ; Which neverthelesse is sufficient to Enflame the *Oile*.

Experiment
Solitary tou-
ching *Nitre*.

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IT is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Cloaths be put into it, it scoureth them of it selfe : And if they stay any whit long, they moulder away. And the scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold* ; And we see *Warme Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which severeth and divideth any thing that is foule, and Viscous, and sticketh upon a Body.

Experiment
Solitary tou-
ching Congea-
ring of Aire.

363

TAke a *Bladder*, the greatest you can get ; Fill it full of Winde, and tye it about the Neck with a Silke thred waxed ; And upon that likewise Wax very close ; So that when the Neck of the *Bladder* drieth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conservatory of Snow*, the *Snow* being made hollow about the *Bladder* ;

Bladder; And after some Fortnights distance, see whether the *Bladder* be shrunk: For if it be, then it is plain, that the *Coldnesse* of the *Earth* or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

It is a Report of some good credit, that in *Deepe Caves*, there are *Pensile Chrystall*, and *Degrees of Chrystall* that drop from above; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Worke of Cold, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great Frosts, upon a Hollow Vessell, putting a Canvase between, that it falleth not in: And poure *Water* upon it, in such Quantity as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the *Earth* narrower at the bottome, than at the Top, in fashion of a *Sugar Loafe* Reversed, it will help the Experiment. For it will make the Ice, where it Issueth, lesse in Bulk; And evermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary touching
Congealing of *Water*
into *Chrystall*.
364

TAKE *Damaske Roses*, and pull them; Then drie them upon the Top of an House, upon a Lead or Tarras, in the Hot Sun, in a clear day, between the Houres (onely) of twelve and two, or thereabouts. Then put them into a Sweet Drie Earthen Bottle, or a Glasse with narrow Mouthes, stuffing them close together, but without Bruising: Stop the Bottle, or Glasse, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it be not drawn out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture* along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the Drying have little or no Smell; So that the Smell is a Second Smell, that issueth out of the Flower afterwards.

Experiment
Solitary, touching
Preserving of *Rose*
leaves both in
Colour and
Smell.
365

THE Continuance of Flame, according unto the diversity of the Body Enflamed, and other Circumstances, is worthy the Enquiry; Chiefly, for that though Flame be (almost) of a Momentany Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of Bodies Enflamed, wholly, and Immediately, without any Wieke to helpe the Inflammation. A Spoonfull of Spirit of Wine, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of Spirit of Wine, Mixed with the Sixth Part of a Spoonfull of Nitre burnt but to the space of 94. Pulses. Mixed with the like Quantity of Bay-salt, 83. Pulses. Mixed with the like Quantity of Gunpowder, which dissolved into a Blacke water, 110. Pulses. A Cube, or Pellet of Yellow Wax, was taken, as much as halfe the Spirit of Wine, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of Milke, it burnt to the space of 100. Pulses; And the Milke was crudled. Mixed with the Sixth Part of a spoonfull of Water, it burnt to the space of 86. Pulses; With an Equall Quantity of Water, onely to the space of 4. Pulses. A small Pebble was laid in the Middest, and the Spirit of Wine burnt to the space of 94. Pulses.

Experiments
in Consort,
touching the
Continuance of
Flame.
366

Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. So that the *Spirit of Wine Simple*, endured the longest; And the *Spirit of Wine* with the *Bay-salt*, and the Equall Quantity of *Water*, were the shortest.

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Consider wel, whether the more speedy Going forth of the *Flame*, be caused, by the Greater Vigour of the *Flame* in Burning; Or by the Resistance of the body mixed, and the Aversion thereof to take *Flame*: Which will appear by the Quantity of the *Spirit of Wine*, that remaineth after the Going out of the *Flame*. And it seemeth clearly to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit of Wine* burned, till it goe out of it self, will burn no more; And tasteth nothing so hot in the Mouth as it did; No nor yet sowre, as if it were a degree towards *Vinegar*, which Burnt *Wine* doth; but flat and dead.

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Note, that in the Experiment of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it self, with the *Spirit of Wine*, to produce on *Flame*; but wheresoever the *Wax* floated, the *Flame* forsook it, till at last it spread all over, and put the *Flame* quite out.

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The Experiments of the Mixtures of the *Spirit of Wine* enflamed, are Things of discovery, and not of Use: But now we will speak of the Continuance of *Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wicke* that provoketh *Inflammation*. And this importeth not onely Discovery, but also Use and Profit; For it is a great Saving in all such Lights, if they can be made as faire and right as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* severally into Candle stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vita*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Every of these bearing a Sixth Part to the *Wax*; And every of these *Candles Mixed*, being of the same Weight and *Wicke*, with the *Wax Pure*, proved thus in the Burning, and Lasting. The Swiftest in Consuming was that with *Saw dust*; Which first burned faire till some part of the *Candle* was consumed, and the Dust gathered about the Snafte; But then it made the Snafte big, and long, and to burn dusky, and the *Candle* wasted in half the time of the *Wax Pure*. The next in Swiftnesse, were the *Oyle*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vita*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vita*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted above some Twelve Pulses: But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while, it would harden and cake about the Snafte; So that the Mixture of *Bay-salt* with *Wax*, will winne an Eighth part of the time of lasting, and the *Water* a Fifth.

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After the Severall Materials were tried, Triall was likewise made of severall *Wickes*; As of Ordinary *Cotton*, *Sowing Thred*, *Rush*, *Silke*, *Straw*, and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they came to the *Wax*, and then goe out: of the Other Three, the *Thred* consumed faster than the *Cotton*, by a Sixth part of Time: The *Cotton* next: Then the *Rush* consumed

sumed flower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike; and the *Rush* much lesse, and dimmer. *Quere*, whether *Wood*, and *Wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*?

We have spoken of the Severall *Materials*, and the Severall *Wickes*: But to the *lasting* of the *Flame*, it importeth also; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houswives*, to make their *Candles* burne the longer, use to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the flower: Infomuch, as by this meanes, they will out-last other *Candles*, of the same stuffe, almost Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the *Bran*, doth help to the Lasting. And we see that *Wax Candles* last longer than *Tallow Candles*, because *Wax* is more firme, and hard.

The *Lasting* of *Flame* also dependeth upon the *easie Drawing* of the *Nourishment*; As we see in the *Court of England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of wax, with the *Wicke* in the Middest; whereby it commeth to passe, that the *Wicke* fetcheth the *Nourishment* further off. We see also that *Lamps* last longer, because the vessell is farre broader, than the Breadth of a Taper, or Candle.

Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* standeth: Make only one Hole in it, at the End of the Returne furthest from the *Turret*. Reverse it, and fill it full of *Oile*, by that Hole; And then set it upright againe; And put a *Wicke* in at the Hole; And lighten it: You shall finde, that it will burne flow, and a long time: Which is caused, (as was said last before,) for that the *Flame* fetcheth the *Nourishment* as farre off. You shall finde also, that as the *Oile* wasteth, and descendeth, so the Top of the *Turret*, by little and little, filleth with *Aire*; which is caused by the Rarefaction of the *Oile* by the Heat. It were worthy the Observation, to make a Hole, in the Top of the *Turret*; and to trie, when the *Oile* is almost consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good also to have the *Lampe* made, not of *Tinne*, but of *Glasse*, that you may see how the Vapour, or *Aire* gathereth, by degrees, in the Top.

A Fourth Point, that importeth the *lasting* of the *Flame*, is the *Closeness* of the *Aire*, wherein the *Flame* burneth. We see, that if *Wind* bloweth upon a *Candle*, it wasteth apace. We see also, it lasteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*.

A Fifth Point, that importeth the *Lasting* of the *Flame*, is the *Nature* of the *Aire*, where the *Flame* burneth; whether it be Hot or Cold; Moist or Drie. The *Aire*, if it be very Cold, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frostie weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be Drie, is indifferent: The *Aire*, if it be Moist, doth in a Degree quench the *Flame*: (As we see *Lights* will goe out in the *Damps* of *Mines*;) And howsoever maketh it burne more dully: And so helpeth the *Continuance*.

Burials in Earth serve for Preservation; And for Condensation; And for Induration of Bodies. And if you intend Condensation, or Induration, you may

Experiments in Consort, touching Burials or Infusions of divers Bodies in Earth.

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may bury the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may do for *Conservation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *Vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the *Moisture*, causing them to putrifie, than good by the virtual *Cold*, to conserve them; Except the *Earth* be very Drie, and Sandy.

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An *Orenge*, *Limmon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Fortnights Space, foure Foot deepe within the *Earth*, though it were in a Moist Place, and a Rainy Time, yet came forth, no wayes mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Juyce somewhat flatted. But with the *Buriall* of a Fortnight more they became Putrified.

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A *Bottle* of *Beere*, buried in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before,

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It were a profitable *Experiment*, to preserve *Orenge*s, *Limmons*, and *Pomgrates*, till Summer; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatory* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him be provided of three Things; A *Conservatory* of *Snow*; A good large *Vault*, twenty foot at least under the Ground; And a *Deep Well*.

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There hath beene a Tradition, that *Pearle*, and *Corall*, and *Surchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But upon Triall of Sixe Weekes *Buriall*, there followed no Effect. It were good to trie it, in a *Deepe Well*; Or in a *Conservatory* of *Snow*, where the *Cold* may be more Constringent; And so make the *Body* more united, and thereby more Resplendent.

Experiment
Solitary, touching the
Affects in
Mens Bodies
from severall
Winds.

381

MENS *Bodies* are heavier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The Cause is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and waxe fluide, and so flow into the Parts; As it is seen in *Wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the *Sinewes*, which, when the *Southerne Wind* bloweth, are more relax.

Experiment
Solitary touching Winter
and Summer
Sicknesses.

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IT is commonly seen, that more are Sick in the Summer, and more Dye in the Winter; Except it be in *Pestilent Diseases*, which commonly raigne in Summer, or Autumne. The Reason is, because *Diseases* are bred (indeed) chiefly by Heat; But then they are Cured most by Sweat, and Purge; which in the Summer commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in Summer, is because they are bred most in the Summer; For otherwise those that are touched are in most danger in the Winter.

THe Generall Opinion is, that *Yeares Hot and Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat and Moisture* cause *Putrifaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Drie Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *Waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot and Dry*.

Experiment
Solitary touching
Pestilentiall Seasons.

383

MAny *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause if falsly imputed to the *Constitution* of the *Aire*, at that time, when they breake forth, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Nature* of the *Precedent* foure *Seasons* of the *Yeare*.

Experiment
Solitary touching an
Error received about
Epidemicall *Diseases*.

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TRiall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of *Twenty Fathom* deepe, at the least; And some of the *Bottles* have bee let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, not *New*, but *Ready* for drinking,) and *Wine*, and *Milke*. The *Prooffe* hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But as good, or somewhat better, than *Bottles* of the same *Drinkes*, and *Stalenessse*, kept in a *Celler*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were *Fresh*. The *Milke* sowered, and began to Putrifie. Neverthelesse it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some Cause of this *Triall* of *Hanging Milke* in the *Well*: But our *prooffe* was naught; Neither doe I know, whether that *Milke* in those *Caves*, bee first boyled. It were good therefore to trie it with *Milke Sodden*, and with *Creame*; For that *Milke* of it selfe is such a *Compound Body*, of *Creame*, *Curds*, and *Whey*, as it is easily *Turned*, and *Dissolved*. It were good also to trie the *Beere*, when in is in *Wort*, that it may bee scene, whether the *Hanging* in the *Well*, will *Accelerate* the *Ripening* and *Clarifying* of it.

Experiment
Solitary touching the
Alteration or
Preservation
of *Liquours* in
Wells, or *deepe*
Vaults.

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DIvers, wee see, doe *Stut*. The Cause may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore wee see, that *Naturalls* doe generally *Stut*: And wee see that in those that *Stut*, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth: And so wee see, that they that *Stut*, doe *Stut* more in the first offer to speake, than in *Continuance*; Because the *Tongue* is, by *Motion*, somewhat heated. In some also, it may be, (though rarely,) the *Drinessse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*; For it is an Affect that cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Lingua Prædita*; And many *Stutters* (wee finde) are very *Cholerick Men*; *Choler* Enducing a *Drinessse* in the *Tongue*.

Experiments
Solitary, touching
Stutting

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Experiments
in Consort,
touching the
Smells.

387

S *Smells*, and other *O dours*, are Sweeter in the Aire, at some Distance, than neare the Nose ; As hath beene partly touched heretofore. The Cause is double : First the finer Mixture, or Incorporation of the *Smell* : For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other Reason is, for that all Sweet *Smells* have joyned with them, some *Earthy* or *Crude O dours* ; And at some distance the Sweet, which is the more Spirituall, is perceived ; And the *Earthy* reacheth not so farre.

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Sweet *Smells* are most forcible, in *Drie Substances*, when they are Broken ; And so likewise in *Orenge*s, or *Limon*s, the Nipping of their Rinde, giveth out their *Smell* more : And generally, when *Bodies* are Moved or Stirred, though not Broken, they *Smell* more ; As a Sweet-Bagge waved. The Cause is double : The one, for that there is a Greater Emission of the Spirit, when Way is made : And this holdeth in the Breaking, Nipping, or Crushing ; It holdeth also, (in some degree) in the Moving : But in this last, there is a Concurrence of the Second Cause ; Which is the Impulsion of the Aire, that bringeth the Sent faster upon us.

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The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves* smell not ; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Wood-bine*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The Cause is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves* Odorate, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves* ; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the Spirit of the *Plant* is digested and refined, and severed from the Groffer Iuyce, in the Efflorescence, and not before.

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Most *O dours* smell best, Broken or Crushed, as hath beene said ; But *Flowers* Pressed or Beaten, doe lesse the Freshnesse and Sweetnesse of their *O dour*. The Cause is, for that when they are Crushed, the Groffer and more *Earthy Spirit* commeth out with the Finer, and troubleth it ; Whereas in stronger *O dours* there are no such Degrees of the Issue of the *Smell*.

Experiments
in Consort,
touching the
Goodnesse and
Choyce of
Water.

391

I T is a Thing of very good Use, to Discover the Goodnesse of *Waters*. The Taste, to those that Drinke *Water* onely, doth somewhat : But other Experiments are more sure. First, try *Waters* by weight ; Wherein you may finde some difference, though not much : And the Lighter you may account the Better.

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Secondly, try them by Boyling upon an Equall Fire : And that which consumeth away fastest, you may account the Best.

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Thirdly, try them in Severall Bottles, or Open Vessels, Matches in every Thing else, and see which of them Last Longest, without Stench, or Corruption : And that which holdeth Unputrified longest, you may likewise account the Best.

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Fourthly, try them by Making Drinkes Stronger, or Smaller, with the same Quantity of Mault ; And you may conclude, that that *water*, which maketh the Stronger Drinke, is the more Concocted, and Nourishing ; though perhaps it be not so good for Medicinall use. And such *Water* (commonly) is the *Water* of Large and Navigable Rivers : And likewise in Large and Cleane Ponds of Standing *Water* : For upon both them, the Sunne hath more power than upon Fountaines, or Small Rivers. And I conceive that Chalke-*Water* is next them the best, for going furthest in Drinke : For that also helpeth Concoction ; So it be out of a Deepe Well ; For then it Cureth the

the Rawnesse of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloths, which weare out apace, if you use such *Waters*.

Fifthly, the Houfwives doe finde a Difference in *Waters*, for the *Bearing* or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*.

Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-Water* is, by the *Physicians* esteemed the Finest, and the best; But yet it is said to putrifie soonest; which is likely, becaufe of the Finenesse of the Spirit: And in *Conservatories* of *Raine-water*, (such as they have in *Venice*, &c.) they are found not so Choice *Waters*; The worfe, (perhaps,) becaufe they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholesome; In so much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwise upon the Ascent, (especially the Women,) by drinking or *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it be upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High Hills* are the best: For both they seeme to have a Lightnesse, and Appetite of Mounring; And besides they are most pure and unmingled: And againe, are more Percolated thorow a great space of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the same Levell; Whereas *Springs* on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *Waters*.

Seventhly, Judgment may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly, that upon *Sand*; And Worst of all upon *Madde*. Neither may you trust *Waters* that Taste Sweet; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth.

IN *Peru*, and divers Parts of the *West-Indies*, though under the *Line*, the Heats are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The Causes are, First, the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another Cause is, for that the Length of the Night, and the Dewes thereof, doe compensate the Heat of the Day. A third Cause is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For under the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrida Zone*, it doubleth, and goeth back againe, and so maketh one Long Summer.

THE Heat of the Sunne maketh Men Blacke in some Countries, as in *Aethiopia*, and *Ginny*, &c. Fire doth it not, as wee see in *Glasse-Men*, that are continually about the Fire. The Reason may bee, becaufe Fire doth lick up the Spirits, and Bloud of the Body, so as they Exhale; So that it ever maketh Men looke Pale and Sallow; But the Sunne, which is a Gentler Heat, doth but draw the Bloud to the Outward Parts, And rather Concocteth it, than Soaketh it: And therefore wee see that all

Experiments
Solitary touching the
Temperate
Heat under
the *Aequino-
ctial*

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Experiment
Solitary touching the Co-
loration of
Blacke and
Tawney
Moors.

399

Aethiopes

Aethiopes are Fleshly, Plumpe, and have great Lips; All which beroken *Moisture* retained, and not drawne out. We see also, that the *Negroes* are bred in Countries that have plenty of *Water*, by *Rivers*, or otherwise: For *Meroe*, which was the *Metropolis* of *Aethiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through *Moisture*: But the Countries of the *Abyssenes*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Aethiopes*, as they are Plumpe, and Flethy; So (it may be) they are Sanguine, and ruddy Coloured, if their black Skinne would suffer it to be seene.

Experiment
Solitary touch-
ing Motion
after the In-
stant of Death
400

SOME *Creatures* doe move a good while after their Head is off, As *Birds*. Some a very little time; As *Men*, and all beasts. Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene severed; And it is a Report also of Credit, that the Head of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, & the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath been thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the Head, and Cells of the Braine, which in *Men*, and *Beasts* are Large; And therefore, when the Head is off, they move little or nothing. But *Birds* have small Heads, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoot a great Forked Arrow at an *Estrieh*, as she ran swirly upon the Stage, and strook off her Head, And yet she continued the Race, a little way, with the Head off. As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.

NATURALL HISTORIE.

V. Century.

VV E will now enquire of *Plants or Veteables*: And we shall doe it with diligence. They are the principall Part of the *Third dayes work*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the *VVords of Essence*; And they are of excellent and generall *Vse*, for Food, Medicine, and a Number of Mechanicall Arts.

Experiments
in Consort
touching the
Acceleration
of Germinati-
on.

There were sown in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed* and *Pease*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and supported round about with Planks; and upon the Top was cast Sifted Earth, some two Fingers deep; And then the *Seed* sprinkled upon it, having been steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, & the *VVheat*, came up halfe an Inch above Ground, within two dayes after, without any Watering. The rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have been the speedier. This is a Noble *Experiment*; For without this help, they would have beene foure times as long in comming up. But there doth not occurre to me, at this present, any use thereof, for profit; Except it should be for Sowing of *Pease*, which have their price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

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There was *wheat*, steeped in *Water* mixed with *Cow-dung*; Others in *Water* mixed with *Horse-Dung*; Oher in *Water* mixed with *Pigeon-Dung*; Oher in *Vrine* of *Man*; Oher in *Water* mixed with *Chalke* Powdred; Oher in *VVater* mixed with *Soot*, Oher in *VVater* mixed with *Ashes*; Oher in *Wa-*

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ter mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit of Wine*. The proportion of the Mixture was, a fourth Part of the Ingredients to the *Water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit of Wine*, were simple without mixture of *Water*. The Time of Steeping was twelve hours. The Time of the Yeare *October*. There was also other *Wheat* sown *unsteeped*, but *watred* twice a day with *Warm water*. There was also other *Wheat* sown *Simple* to compare it with the rest. The event was; that those that were in the Mixture of *Dung*, and *Vrine*, *Soot*, *Chalk*, *Ashes*, and *Salt*, came up within 6 dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were, first the *Vrine*, and then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, *unsteeped*, and *unwatered*; Next the *watred twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the Ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit of Wine*, they came not up at all. This is a Rich Experiment for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the Vigour of the *Seed*; Which also partly appeared in the former Experiment, as hath been said. This Experiment would be tried in other *Grains*, *Seeds*, and *Kernells*; For it may be some Steeping will agree best with some *Seeds*. It would be tried also with *Roots* steeped as before, but for longer time. It would be tried also in *Severall Seasons* of the Yeare, especially in the *Spring*.

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Strawberries watered now and then, (as once in three dayes,) with *Water*, wherein hath been steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Grains* or *Trees*. And therefore it is an Experiment, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to help the Ground with Mucke; And likewise to Recomfort it sometimes with Muck put to the Roots; But to water it with *Muck water*, which is like to be more Forcible, is not practised.

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Dung, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may be these helps are too Hot.

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The former Means of helping Germination, are either by the Goodnesse and Strength of the Nourishment; Or by the Comforting & Exciting the Spirits in the Plant, to draw the Nourishment better. And of this latter kind, concerning the Comforting of the Spirits of the Plant, are also the experiments that follow; Though they be not Applications to the Root, or Seed. The Planting of Trees warme upon a Wall, against the South, or South East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to be better than the South-West, though the South-West be the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succeedeth the Cold of the Night: and partly, because, (many times) the South-west Sunne is too Parching. So likewise the Planting of them upon the Back of a Chimney where a Fire is kept, doth hasten their Comming on, and Ripening: Nay more, the Drawing of the Boughes into the Inside of a Room, where a Fire is continually kept, worketh the same Effect; which hath been tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad.

Besides

Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making Way* for the *Easie Com- ming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new *Earth*, once in two yeares, (which is the same thing; For the new *Earth* is ever looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

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But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske Rose* with the *Root* on, was set in a *Chamber*, where no *Fire* was, upright in an *Earthen Pan*, full of *Faire Water*, without any *Mixture*, halfe a foot under the *Water*, the *Standard* being more than two *Foot* high above the *Water*: Within in the *Space* of ten dayes, the *Standard* did put forth a faire *Greene* leafe, and some other little *Buds*, which stood at a stay, without any *Shew* of decay or withering, more than seven *Dayes*. But afterwards that *Leafe* faded, but the young *Buds* did sprout on; which afterward opened into fair *Leaves*, in the space of three *Moneths*; And continued so a while after, till upon *Removall* we left the *Triall*. But note that the *Leaves* were somewhat paler, & lighter-colored, than the *Leaves* use to be abroad. Note that the first *Buds* were in the *End* of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater strength, and (it may be) to have growne on to beare *Flowers*. By this *Meanes*, you may have, (as it seemeth,) *Roses* set in the midst of a *Poole*, being supported with some stay; Which is *Matter* of *Rarenesse* and *Pleasure*, though of small *Use*. This is the more strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the *Horse-dung* about the fourth Part to the *Water*, and in four Moneths space (while it was observed) put not forth any *Leafe*, though divers *Buds* at the first, as the other.

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A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all under *Water*, some two or three *Fingers* deep; And within seven dayes sprouted, and continued long after, further *Growing*. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had faire *Leaves*; And so continued, till the end of *November*.

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Note that if *Roots*, or *Pease*, or *Flowers*, may be *Accelerated* in their *Com- ming* and *Ripening*, there is a double *Profit*; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returnes*: For in some *Grounds* which are strong, you shall have a *Raddish*, &c. come in a *Moneth*; That in other *Grounds* will not come in two; And so make double *Returnes*.

409

Wheat also was put into the *Water*, and came not forth at all; So as it seemeth there must be some *Strength* and *Bulke* in the *Body*, put into the *water*, as it is in *Roots*; For *Graines*, or *Seeds*, the *Cold* of the *water* will mortifie. But casually some *Wheat* lay under the *Pan*, which was somewhat moistened by the *Suing* of the *Pan*; which in six weekes (as afore- said) looked mouldy to the *Eye*, but it was sprouted forth halfe a *Fin- gers* length.

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It seemeth by these *Instances* of *Water*, that for *Nourishment*, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* upright, and save it from *Over-heat*, and *Over-cold*; And therefore is a *Comfortable Ex- periment* for good *Drinkers*. It proveth also that our former *Opinion*; That

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Drinke

Drinke incorporate with Flesh, or Roots, (as in *Capon-Beere*, &c.) will nourish more easily, than Meat and Drinke taken severally.

412

The *Housing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons* : And as we *House Hot Countrey Plants*, as *Lemons*, *Orenges*, *Myrtles*, to save them ; So we may *House* our own *Countrey Plants*, to forward them, and make them come in the *Cold Seasons* ; In such sort, that you may have *Violets*, *Strawberries*, *Pease*, all *Winter* : So that you sow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughs*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments
in Confort,
touching the
Putting backe
or Retardation
of Germination

413

TO make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the *Ancients* esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having been lesse exhiled by the *Sunne*. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they have done *Bearing* ; And then they will come againe the same yeare about *November*. But they will not come just on the *Tops*, where they were cut, but out of those *Shoots*, which were (as it were,) *Water Boughs*. The *Cause* is, for that the *Sap*, which otherwise would have fed the *Top*, (though after *Bearing*,) will, by the discharge of that, divert unto the *Side-Sprouts* ; And they will come to beare, but later.

414

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted* ; For then the *Side-Branches* will beare. The *Cause* is the same with the former. For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the *Sap* for a time, and *Diversion* of it to the *Sprouts*, that were not so forward.

415

The Third is the *Cutting off* some few of the *Top-Boughes* in the *Spring-time*, but suffering the lower *Boughes* to grow on. The *Cause* is, for that the *Boughes* doe helpe to draw up the *Sap* more strongly ; And we see that in *Powling* of *Trees*, many doe use to leave a *Bough* or two on the *Top*, to helpe to draw up the *Sap*. And it is reported also, that if you graft upon the *Bough* of a *Tree*, and cut off some of the old *Boughes*, the new *Cions* will perish.

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The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the *Sap*, from going upwards, for a time ; Which Arrest is afterwards released by the *Covering* of the *Root* againe with *Earth* ; And then the *Sap* getteth up, but later.

417

The Fifth is the *Removing* of the *Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remove*, for the *Reletling*, before it can draw the *Juyce* ; And that time being lost, the *Bl'osome* must needs come forth later.

418

The Sixth is the *Grafting* of *Roses* in *May*, which commonly *Gardiners* doe not till *Iuly* ; And then they beare not till the *Nex: Yeare* ; But if you graft them in *May*, they will beare the same yeare, but late.

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The Seventh is the *Girding* of the *Body* of the *Tree* about with some *Pack-threed* ; For that also in a degree, restraineth the *Sap*, and maketh it come up more late, and more Slowly.

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The Eighth is the *Planting* of them in a *Shade*, or in a *Hedge*. The *Cause* is, partly the *Keeping out* of the *Sunne*, which hasteneth the *Sap* to rise ; And partly the *Robbing* of them of *Nourishment*, by the *Stuffe* in the *Hedge*. These *meanes* may be practised upon other, both *Trees*, and *Flowers*, *Mutatis Mutandis*.

Men

Men have entertained a Conceit that sheweth pretilly ; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-Tree* that *Commeth early*, the Graft will beare *Fruit Early* ; As a Peach upon a Cherry, And contrariwise, if an *Early-Comming-Fruit* upon a Stock of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late ; As a Cherry upon a Peach. But these are but Imaginations, and untrue. The Cause is, for that the Cions overruleth the Stock quite ; And the Stock is but Passive onely, and giveth Aliment, but no Motion to the Graft.

421

VVe will speake now, how to make *Fruits, Flowers, and Roots* larger, in more plenty and sweeter than they use to be ; And how to make the *Trees* themselves, more Tall ; more Spread ; and more Hasty and Sudden ; than they use to bee. VWherein there is no doubt, but the former *Experiments of Acceleration*, will serve much to these Purposes. And againe, that these *Experiments*, which we shall now set downe, doe serve also for *Ascleartion* ; because both Effects proceed from the Encrease of vigour in the Tree ; But yet to avoid Confusion, And because some of the Meanes are more proper for the one Effect, and some for the other, we will handle them apart.

Experiments, in Consort, touching the Melioration of Fruit, Trees, and Plants.

It is an assured Experience, that an *Heape of Flint or Stone*, laid, about the *Bottom* of a *Wild-Tree*, (as an Oake, Elme, Ash, &c.) upon the first Planting, doth make it prosper double as much, as without it. The Cause is, for that it retaineth the Moisture, which falleth at any time upon the *Tree*, and suffereth it not to be exhaled by the Sunne. Again, it kepeth the *Tree* warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will over-Moisten the Roots, so as the Wormes will eat them.

422

A *Tree*, at the first *Setting*, should not be *Shaken*, untill it hath taken Root fully : And therefore some have put two little Forkes about the *Bottom* of their *Trees*, to keep them upright ; But after a yeares Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

423

Generally, the *Cutting away of Boughes and Suckers* at the Root and Body, doth make *Trees* grow high ; And contrariwise, the *Powling and Cutting* of the Top, maketh them grow spread, and bushy. As we see in *Pollards, &c.*

424

It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow, Sallow, Poplar, Alder*, of some seven yeares growth ; And to set them, not upright, but a-slope, a reasonable depth under the Ground ; And then, instead of one Root, they will put forth many, and so carry more Shoots upon a Stemme.

425

When you would have many new Roots of *Fruit Trees*, take a *Low Tree*, and bow it, and lay all his branches a-flat upon the Ground, and cast Earth upon them ; And every Twigge will take Root. And this is very profitable

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ble Experiment for Costly Trees ; (for the Boughes will make Stockes without charge ;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Muske-Roses, &c.*

427

From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alballontide* in the bare Place, and set it in Ground ; And it will grow to be a faire Tree in one Yeare. The Cause may be, for that the *Baring* from the *Barke* keepeth the Sap from descending towards Winter, and so holdeth it in the Bough ; And it may bee also that the Loam and Horse-dung applyed to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of Trees in their Boughes ; Which may serve to other Effects.

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It hath been practised in Trees, that shew faire, and beare not, to Bore a Hole thorow the Heart of the Tree, and thereupon it will beare. Which may be, for that the Tree before had too much Repletion, and was oppressed with his owne Sap ; For Repletion is an Enemy to Generation.

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It hath beene practised in Trees, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The Cause may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree ; but it will not keep open without somewhat put into it.

430

It is usually practised ; to set Trees that require much Sunne, upon Walls against the South ; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double Commoditie ; The one, the Heat of the Wall by Reflexion ; The other, the Taking away of the Shade ; For when a Tree groweth round, the upper Boughes over-shadow the lower. But when it is spread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

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It hath also been practised (by some) to pull off some Leaves from the Trees so spread, that the Sunne may come upon the Bough and Fruit the better. There hath been practised also a Curiositie, to set a Tree upon the North-Side of a Wall, and at a little height, to draw him thorow the Wall, and spread him upon the South-Side : Conceiving that the Root and lower Part of the Stocke should enjoy the Freshness of the Shade ; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it sorted not ; The Cause is, for that the Root requireth some Comfort from the Sunne, though under Earth, as well as the Bodie : And the Lower Part of the Bodie more than the Upper, as wee see in Compassing a Tree below with straw.

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The Lowness of the Bough, where the Fruit commeth, maketh the Fruit greater, and to ripen better ; For you shall ever see in *Apricots, Peaches*, or *Melo-Corones*, upon a wall, the greatest Fruits towards the Bottom. And in France the Grapes that make the Wine, grow upon the low Vines, bound to small Stakes. And the raised Vines in Arbours make but Verjuice. It is true, that in Italy, and other Countries, where they have hotter Sunne, they raise them upon Elmes, and Trees ; But I conceive, that if the French Manner of Planting low, were brought in use, their Wines would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to trie whether a Tree grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually pruned off, would not make a larger Fruit.

To have *Fruit* in *Greater Plentie*, the way is, to graft, not only upon young *Stocks*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of *Fruit*; Whereas if you graft but upon one *Stocke*, the *Tree* can beare but few.

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The *Diging* yearly about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceive would advance them likewise.

434

It hath beene knowne, that a *Fruit-Tree* hath beene blown up (almost) by the *Roots*, and set up againe, and the next yeare bare exceedingly. The *Cause* of this, was nothing but *Loosening* of the *Earth*, which comforteth any *Tree*, and is fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly removed into *New Grounds*, as *Flowers* and *Herbs* may.

435

To revive an *Old Tree*, the *Digging* of it about the *Roots*, and *Applying* new *Mould* to the *Roots*, is the *Way*. We see also that *Draught-Oxen*, put into fresh *Pasture*, gather new and tender *Flesh*; And in all *Things*, better *Nourishment* than hath been used, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

436

If an *Herbe* be cut off from the *Roots*, in the beginning of *Winter*, and then the *Earth* be trodden and beaten downe hard, with the *Foot* and *Spade*, the *Roots* will become of very great *Magnitude* in *Summer*. The *Reason* is, for that the *Moisture* being forbidden to come up in the *Plant*, stayeth longer in the *Root*, and so dilateth it. And *Gardeners* use to tread downe any loose *Ground*, after they have sowne *Onions*, or *Turnips*, &c.

437

If *Panicum* be laid below, and about the *Bottom* of a *Root*, it will cause the *Root* to grow to an *Excessive Bignesse*. The *Cause* is, for that being it selfe of a *Spungy Substance*, it draweth the *Moisture* of the *Earth* to it, and so feedeth the *Root*. This is of greatest use for *Onions*, *Turnips*, *Parsnips*, and *Carrets*.

438

The *Shifting* of *Ground* is a *Meanes* to better the *Tree*, and *Fruit*; But with this *Caution*; That all *Things* doe prosper best, when they are advanced to the better: Your *Nurserie* of *Stocks* ought to be in a more *Barren* *Ground*, than the *Ground* is whereunto you remove them. So all *Grafs* preferre their *Cattell* from meaner *Pastures* to better. We see also, that *Hardnesse* in *Youth* lengthneth *Life*, because it leaveth a *Cherishing* to the better, of the *Body*, in *Age*: Nay in *Exercises*, it is good to begin with the hardest, as *Dancing* in *Thicke Shooes*, &c.

439

It hath beene observed, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acrosse, so as you make them rather in *sliccs*, than in continued *Hacks*, doth great good to *Trees*, And especially delivereth them from being *Hide-bound*, and killeth their *Mosses*.

440

Shade to some *Plants* conduceth to make them large and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall finde the *Strawberries* under those *Leaves* farre more large than their *Fellowes*. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a *Hedge-Row*; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giveth them *Shade*.

441

To increase the *Crops* of *Plants*, there would be considered, not onely the *Increasing* the *Lost* of the *Earth*, or of the *Plant*, but the *Saving* also of that which is spilt. So they have lately made a *Triall*, to *Set Wheat*; which nevertheless

442

verthelesse hath beene left off, because of the trouble and paines ; Yet so much is, true that there is much saved by the *Setting*, in comparision of that which is *Sown*; Both by keeping it from being picked up by Birds ; And by Avoiding the Shallow lying of it, whereby much that is sown taketh no Root.

443 It is prescribed by some of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring ; And then take them up in a warme day, and replant them in good Ground ; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth ; when other *Trees* of the same kinde, doe but blossome. But this seemeth to have no great Probabilitie.

444 It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment*, be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre* ; For *Nitre* is (as it were) the Life of *Vegetables*.

445 Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenge*s ; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*), and they will come up much earlier than in the *Earth* it self. This I conceive to be as a Kinde of *Grafting* in the *Root* ; For as the Stocke of a *Graft* yeeldeth better prepared Nourishment to the *Graft*, than the *Crude Earth* ; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernells* into a *Turnip*, or the like ; Save that the *Squill* is more Vigorous, and Hot. It may bee tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in severall places, when it is almost at his Bignesse, and before it ripeneth, hath beene practised with successe, to ripen the *Fruit* more suddenly. We see the Example of the *Biting* of *Wasps*, or *Wormes*, upon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-Weed*) put under the *Roots* of *Colworts*, and (perhaps) of other *Plants*, will further their Groweth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilite.

448 It hath beene practised, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, close by the *Earth* ; And then to cast a pretty Quantity of *Earth* upon the *Plant* that remaineth, and they will bear the next year *Fruit*, long before the ordinarie time. The *Cause* may be, for that the *Sap* goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annually*, seemeth to be partly caused by the Over-Expende of the *Sap* into *Stalke*, and *Leaves* ; which being prevented, they will super-annate, if they stand warme.

449 The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest ; For that the *Sap* hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree* ; Or the *Acornes*, and *Chestnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentiful *Fruit* ; Or else, the same yeares, larger *Leaves*, because of the *Sap* stored up.

It hath been generally received, that a *Plant watered* with *Warme Water*, will come up sooner and better, than with *Cold Water*, or with *Showers*. But our *Experiment* of *Watering Wheat* with *Warm Water* (as hath been said) succeeded not; which may be, because the *Triall* was too late in the *Yeare*, viz. in the End of *October*. For the *Cold* then comming upon the *Seed*, after it was made more tender by the *Warm Water*, might checke it.

451

There is no doubt, but that *Grafting* (for the most Part) doth *meliorate* the *Fruit*. The *Cause* is manifest; For that the *Nourishment* is better prepared in the *Stock*, than in the *Crude Earth*: But yet note well, that there bee some *Trees*, that are said to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cause* I suppose to bee, for that those *Plants* require a *Nourishment* of great *Moisture*; And though the *Nourishment* of the *Stock* be finer, and better prepared, yet it is not so moist, and plentifull, as the *Nourishment* of the *Earth*. And indeed we see those *Fruits* are very *Cold Fruits* in their Nature.

452

It hath been received, that a *Smaller Peare*, grafted upon a *Stock* that beareth a *Greater Pear*, will become *Great*. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stock*; And è *controverso*; Which we rejected before: For the *Cions* will governe. Neverthelesse it is probable enough, that if you can get a *Cions* to grow upon a *Stock* of another kinde, that is much moister than his owne *Stock*, it may make the *Fruit* *Greater*, because it will yeeld more plentifull *Nourishment*; Though it is like it will make the *Fruit* *Bas*. But generally the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stock* of a *Colewort*, and it will bear a great flaggy *Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will prosper; if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horse-Plumme*, which are the moystest of *Trees*. I have heard that it hath been tried upon an *Elme*, and succeeded.

453

It is manifest by *Experience*, that *Flowers* Removed wax greater, because the *Nourishment* is more easily come by, in the loose *Earth*. It may bee, that Oft *Regrafting* of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stock* the first yeare; And then cut it off, and graft it upon another *Stock* the second year; And so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

454

Of *Grafting* there are many *Experiments* worth the *Noting*, but those we reserve to a proper *Place*.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth *Leavs*, have his *Top* cut off. The *Cause* is plaine, for that the *Sap* hath the lesse to feed, and the lesse way to mount: But it may be the *Figge* will come somewhat later, as was formerly touched. The same may bee tried likewise in other *Trees*.

455

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Trunke* of the *Tree* thorow, in severall places, and thrust into the *Places* bored, *Wedges* of some *Hot Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Juniper*, &c. The *Cause* may be, for that *Adventive Heat* doth chear up the *Native Juyce* of the *Tree*.

456

It is reported, that *Trees* will grow greater, and bear better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cause* may be the *En-*

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creasing the Lust or Spirit of the Root ; These Things being more forcible , than ordinary *Composts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be lesse prickly, and more tender , if the *Seeds* have their Tops dulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer , if you take them out of *Beds* , when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before ; But that was in severall yeares ; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

460 *Coleworts* are reported by one of the Ancients, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender and Dainty , if their *Seeds* be Steeped (a little) in *Milke* ; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Juyce of the Earth, but onely the finer. The same *Experiment* may be made in *Artichoakes* ; and other *Seeds*, when you would take away, either their Flashiness, or Bitternesse. They speake also, that the like Effect followeth, of Steeping in *Water* mixed with *Honey* ; But that seemeth to me not so probable, because *Honey* hath too Quicke a Spirit.

462 It is reported, that *Cucumbers* will be lesse watrie, and more Melon-like , if in the Pit where you let them, you fill it (halfe way up) with *Chasse*, or small *Sticks*, and then powre *Earth* upon them ; For *Cucumbers*, as it seemeth, doe extremely affect Moisture ; And over-drinke themselves ; Which this *Chasse*, or *Chips*, forbiddeth. Nay, it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about five or six Inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot ; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is farre more strange : It is, that if you set a Stake, or Prop, some distance from it, it will grow that way ; Which is far stranger (as is said) than the other : For that *Water* may work by a *Sympathie* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463 It hath been touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive Aliment sufficient ; And yet no more than they can well turn, and digest ; And withall doe sweat out the coursest and unprofitablest Juyce ; Even as it is in *Living Creatures*; which by Moderate Feeding, and Exercise, and Sweat, attain the soundest Habite of Body.

464 As *Terrebraiion* doth *Meliorate Fruit*, so, upon the like reason, doth *Letting* of *Plants* *Bloud* ; As *Pricking Vines*, or other *Trees*, after they be of some Growth ; And thereby letting forth *Gumme*, or *Teares* ; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* have been turned into *Sweet*.

465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*, Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony ; For we see *Swines* and *Pigges* Flesh is the Moistest of *Fleashes*.

It is observed by some, that all *Herbs* wax sweeter, both in Small and Fast, if after they be grown up some reasonable time, they be cut, and so you take the later Sprout. The Cause may be for that the longer the Juyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Causes, why *Grains*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amisse to keep back the Sap of *Herbs*, or the like, by some fit means, till the end of Sumner; whereby (it may be) they will be more Nourishing.

466

As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were set of *Kernels*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) even in *Grafting*, for the same cause, the Choyce of the *Stocke* doth much; Always provided, that it be somewhat inferiour to the *Cions*: For otherwise it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*.

467

Besides the *Means* of *Melioration* of *Fruits*, before mentioned, it is set downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chasse* and *Swines-Dung*; (especially laid up together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

468

It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost Pill be taken off all over.

469

It is delivered by some, that if one take the *Bough* of a *Low-Fruit-Tree*, newly budded, and draw it gently, without hurting it, into an *Earthen Pot* perforate at the bottome to let in the *Plant*, and then cover the *Pot* with Earth, it will yeeld a very lage *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they say,) will be effected, by an *Empty Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if some few Pertusions be made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some give a reason, that the *Fruit*, Loving and Coveting the open Aire and Sun, is invited by those Pertusions, to spread and approach, as neare the open Aire, as it can; and so enlargeth in *Magnitude*.

470

All *Trees*, in *High* and *Sandy Grounds*, are to be set deep; And in *Watry Grounds*, more shallow. And in all *Trees*, when they be removed (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth to have lesse reason; Because the *Stone* lyeth not so neare the Sunne; as the *Tree* groweth.

471

Timber Trees in a *Coppice Wood*, do grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much Sunne and Winde, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than upon a Plaine Wall.

472

It is said, that if *Potato Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinary. The Cause may be, for that Having Earth enough within the *Pot* to nourish them; And then being stopped by the Bottome of the *Pot* from putting Strings downward, they must needs grow greater in Breadth, and Thickness. And it may be, that

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that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

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The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And *Covering* againe the *Root*, something high with *Earth*, will preserve the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath been partly touched before. So that there is a double *Use* of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater; And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by strengthening the *Root*, it will make the *Fruit* also the greater.

475

It is an *Experiment* of great pleasure, to make the *Leaves* of *Shady Trees*, larger than ordinary. It hath been tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted upon the *Stocke* of an Ordinary *Elme*, will put forth *Leaves*, almost as broad as the *Brimme* of ones *Hat*. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that bear no *Fruit*, it will make the greater *Leaves*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leafe*.

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The *Barrennesse* of *Trees* by *Accident*, (besides the *Weaknesse* of the *Soile*, *Seed*, or *Roote*, and the *Injurie* of the *Weather*) comming either of their *Overgrowing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting* too deepe; Or by *Issuing* of the *Sap* too much into the *Leaves*. For all these there are *Remedies* mentioned before.

Experiments
in Confort,
touching
Compound
Fruits and
Flowers.

Wee see that in *Living Creatures*, that have *Male* and *Female*, there is *Copulation* of severall *Kindes*; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and *Asse*; And some other *Compounds*, which we call *Monsters*, though more rare: And it is held, that that *Proverb*, *Africa semper aliquia Monstri parit*, cometh, for that the *Fountains* of *VVaters* there, being rare, divers *Sorts* of *Beasts* come from severall *Parts* to drink; And so being refreshed, fall to couple, and many times with severall *Kinds*. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; which neverthelesse, if it be possible, is more at command than that of *Living Creatures*; For that their *Lust* requireth a voluntary *Motion*: wherefore it were One of the most *Notable Experiments* touching *Plants*, to finde it out: For so you may have great *Varietie* of *New-Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the *Power* to make a *New Kind*. For the *Cions* ever over-tuleth the *Stock*.

477

It hath been set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the *Sides*, and then bind them close together, and set them in the ground, they will come up in one *Stocke*; But yet they will put forth their severall *Fruits* without any *Commixure* in the *Fruit*. VVherein note (by the way) that *Vnity* of *Continuance*, is easier to procure,

procure, than *Unity of Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the *Ground*, and the upper Parts being flatted, and bound close together, will put forth *Grapes* of the severall Colours, upon the same Branch; And *Grape-Stones* of severall Colours within the same *Grape*: But the more, after a yeare or two; The *Unity* (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Uniting*, they be often Warred; For all Moisture helpeth to *Union*. And it is prescribed also, to binde the *Bud*, as soon as it commeth forth, as well as the *Stocke*; At the least for a time.

They report, that divers *Seeds* put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels* put into a *Bottle* with a *Narrow Mouth*, filled with Earth.

It is reported, that young *Trees* of severall kindes, set contiguous without any binding, and very often Warred, in a *Fruitfull Ground*, with the very luxury of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath been propounded; For that the *Binding* doth hinder the *Naturall Swelling* of the *Tree*, which, while it is in Motion, doth better *Vaile*.

There are many Ancient and Received Traditions and Observations, touching the *Sympathy* and *Antipathy* of *Plants*; For that some will thrive best growing neare others; which they impute to *Sympathy*: And some worse; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits; And forsake the true Indication of the Causes; As the most Part of *Experiments*, that concern *Sympathies* and *Antipathies* doe. For as to *Plants*; neither is there any such Secret *Friendship*, or *Hatred*, as they imagine; And if we should be content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Wheresoever one *Plant* draweth such a particular *Juyce* out of the Earth, as it qualifieth the Earth; So as that *Juyce* which remaineth is fit for the other *Plant*, there the Neighbourhood doth good; Because the Nourishments are contrary, or severall: But where two *Plants* draw (much) the same *Juyce*, there the Neighbourhood hurteth; For the one deceiveth the other.

First, therefore, all *Plants* that doe draw much *Nourishment* from the Earth and so soake the Earth, and exhaust it, hurt all things that grow by them; As Great *Trees*, (especially *Ashes*,) and such *Trees*, as spread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* onely; But it is an Enemy to any other *Plant*; Because it draweth strongly the fattest *Juyce* of the Earth. And if it be true, that the *Vine*, when it creepeth neare the *Colewort*, will turne away; This may be, because there it findeth worse Nourishment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

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Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

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Where *Plants* are of severall Natures, and draw severall Juyces out of the Earth, there (as hath been said) the One let by the other helpeth : As it is set down by divers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree* : Which (we conceive) is caused, Not by Reason of *Friendship*, but by *Extraction* of a contrary Juyces: The one Drawing *Juyce* fit to result Sweet, the other bitter. So they have set down likewise, that a *Rose* set by *Garlick* is sweeter: Which likewise may be, because the more Fetide Juyce of the Earth goeth into the *Garlicke*; And the more Odorate into the *Rose*.

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This wee see manifestly, that there be certain *Corn-Flowers*, which come seldome or never in other places, unlesse they be set; But onely amongst *Corne* : As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *wilde Poppy*, and *Fumitory*. Neither can this be, by Reason of the Culture of the Ground, by Plowing or Furrowing; As some *Herbs* and *Flowers* will grow but in *Ditches* new Cast; For if the *Ground* lie fallow, and unfowne, they will not come : So as it should seem to be the *Corne*, that qualifieth the Earth, and prepareth it for their Growth.

483

This Observation, if it holdeth, (as it is very probable,) is of great use, for the *Meliorating* of Taste in *Fruits*, and *Esculent Herbs*; And of the *Sent* of *Flowers*. For I do not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients have noted,) good store of *Rew* planted about the *Figg-Tree*, will make the *Figge* more sweet. Now the *Tastes* that doe most offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*, *Harrish*, *sowre*, and *Watrish*, or *Flashy*. It were good therefore to make the *Trials* following.

484

Take *Wormewood*, or *Rew*, and set it neare *Lettuce*, or *Coleflory*, or *Artichoke*; And see whether the *Lettuce*, or the *Coleflorie*, &c. become not the sweeter.

485

Take a *Service Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which we know have *Fruits* of harsh and binding Iuyce, and set them neare a *Vine* or *Figge-Tree*, and see whether the *Grapes* or *Figgs*, will not be the sweeter.

486

Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Musk-Melons*, and see whether the *Melons* will not be more Winy, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

487

Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

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Take *Common Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and lesse earthy in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more Odorate, or Aromaticall.

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Contrariwise, you must take heed how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse, if it be set with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the strength of an Herbe, you shall do well to set other like Herbs by him, to take him downe; And if you would set *Tansy* by *Angelica*, it may bee, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormwood*, it may bee, the *Wormwood* would turne to be liker *Roman Wormwood*.

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This *Axiome* is of large extent; And therefore would be severed, and refined by *Tryall*. Neither must you expect to have a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

Triall

Triall would be also made in *Herbs*, *Poysonous*, and *Purgative*, whole ill Qualitie(perhaps) may be discharged, or attempted, by Setting stronger *Poysons*, or *Purgatives*, by them.

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It is reported, that the *Shrub* called *Our Ladies Seale*, { which is a Kinde of *Briony*,) and *Coleworts*, set near together, one or both will die. The Cause is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw strong Juices.

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Some of the Ancients, and likewise divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sun*, *Moone*, and some Principall *Starres*; And certain *Herbs*, and *Plants*. And so they have denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that have *Respect* to the *Sunne*, in two *Kinds*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their Leaves abroad, when the *Sunne* shineth serene and fair: And again, (in some part,) close them, or gather them inward, either toward Night, or when the Skie is overcast. Of this there needeth no such Solemne Reason to be assigned, As to say, that they rejoyce at the presence of the *Sunne*; And mourne at the absence thereof. For it is Nothing else, but a little loading of the Leaves, and Swelling them at the Bottome, with the Moisture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Claver* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is nothing but a full Expansion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Marigolds*; *Wart-wort*; *Mallow Flowers*; and others. The Cause is somewhat more Obscure than the former; But I take it to be no other; But that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*: And thereby lesse able to support the *Flower*.

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What a little *Moisture* will doe in *Vegetables*, even though they be dead, and severed from the earth, appeareth well in the *Experiment* of *Juglers*. They take the *Beard* of an *Oate*; which (if you marke it well, is wreathed at the Bottome, and one smooth entire *Straw* at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a Finger in length. Then they make a little *Crosse* of a *Quill*, long-ways of that part of the *Quill*, which hath the Pith; And *Crosse*-ways of that Peece of the *Quill* without Pith: The whole *Crosse* being the Breadth of a Finger high. Then they pricke the Bottome where the Pith is, and thereinto they put the *Oaten beard*, leaving half of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if somewhat in the Box did work the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to stick. Then likewise by way of Imposture, they make a *Question*; As, who is the fairest Woman in the Company? Or, Who hath a Glove, or Card? And cause Another to name divers Persons: And upon every Naming, they stick the *Crosse* in the Box, having first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they touch the *Beard* with the Tip of their Tongue, and wet it; And so stick the *Crosse* in the Box; And then you shall see it turn finely and

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and softly, three or foure Turnes; Which is caued by the untwining of the *Beard* by the Moisture. You may see it more evidently, if you sticke the *Crosse* between your fingers, in itead of the *Box*; And therefore you may see, that this Motion, which is Effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

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It is reported by some, that the *Herbe* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noon-day, when the *Sunne* shineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the *Sunne*. Men favour Wonders. It were good first to be sure, that the Dew that is found upon it, be not the Dew of the Morning Preserved, when the Dew of other *Herbs* is breathed away; For it hath a smooth and thick Leaf, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may be Purslane, or some other *Herbe*, doth the like, and is not marked. But if it be so, that it hath more Dew at Noon than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plumes sweat when they are set into the Oven: for you wil not (I hope) thinke, that it is like *Gedeons Fleece* of wooll, that the Dew should fall upon that, and no where else.

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It is certaine, that the *Honey-dews* are found more upon *Oake leaves*, than upon *Ash*, or *Beech*, or the like: But whether any Cause be from the Leaf it selfe, to concoct the Dew; Or whether it be onely, that the Leaf is Close and Smooth; (And therefore drinketh not in the Dew, but preserveth it;) may be doubted. It would be well inquired, whether *Manna* the Drug, doth fall but upon certain *Herbs* or *Leaves* onely. Flowers that have deep Sockets, doe gather in the Bottome, a kinde of Honey; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*, and the like. And in them certainly the Flower beareth part with the Dew.

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The Experience is, that the *Froth*, which they call *Woodesare*, (being like a kinde of Spittle,) is found but upon certain *Herbs*, and those hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hyssope*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* upon *Corn*, and smutteth it; But it may be, that the same falleth also upon other *Herbs*, and is not observed.

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It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canvasse: Fill it with Earth above the Canvasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But under the Canvasse, some halfe a foot in the Bottome of the Vessell, lay a great *Sponge*, thorowly wet in Water; And let it lye some ten Dayes; And see whether the *Seeds* will sprout, and the Earth become more Moist, and the *Sponge* more drie. The Experiment formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is farre stranger than this.

Experiments
in Confort,
touching the
Making Herbs
and Fruits
Medicinable.

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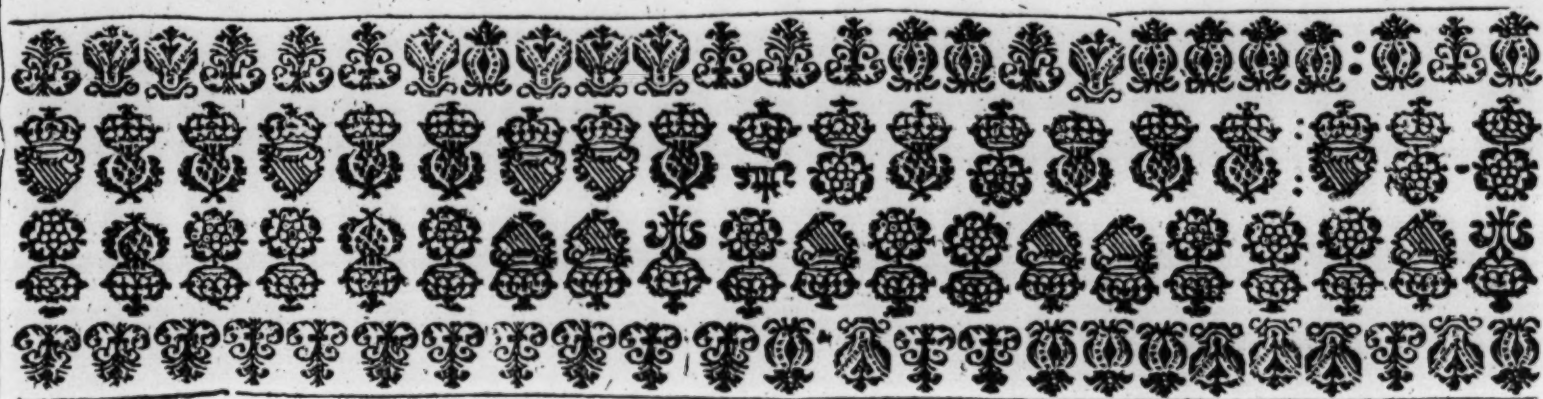
The Altering of the *Seet*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or Letting into the *Barke*, or *Root* of the *Tree*, *Herbe*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance, are but *Fancies*. The Cause is, for that those Things have passed their Period, and nourish not. And all *Alteration* of Vegetables, in those Qualities, must be by somewhat that is apt to go ino the Nourishment of the *Plant*. But this is true, that where *Kine* feed upon
Wilde

Wilde Garlicke, their *Milke* tasted plainly of the *Garlicke*: And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed upon *Wild Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth upon certaine *Herbs*; And *Honey* in *Spain* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was fed with *Napellus*; (which is counted the Strongest poyson of all *Vegetables*) which with use did not hurt the *Maid*, but poysoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; Which appeare to the shew alike; But the Vertuous is taken from the *Beast*, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus farre I am of Opinion; That as Steeped Wines and Beers, are very *Medicinall*; And likewise Bread tempred with divers Powders; So of *Meat* also, (as *Flesh*, *Fish*, *Milke*, and *Egges*,) that they may be made of great use for *Medicine*, & *Diet*, if the *Beast*, *Fowl*, or *Fish*, be fed with a speciall kinde of food, fit for the Disease. It were a dangerous Thing also for secret Empoysonments. But whether it may be applied unto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Juyce, Which is hardly capable of any speciall Quality, untill the *Plant* do assimilate it.

But lest our Incredulitie may prejudice any profitable Operations in this kinde (especially since Many of the Ancients have set them downe,) Wee thinke good briefly to propound the four *Meanes*, which they have devised of Making *Plants Medicinable*. The first is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammomy*, *Triacle*, &c. And then binding it up againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the *Earth*; And so the Nourishment is the more Common, and lesse Qualified: And besides it is a long time in *Going* up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*; Which is somewhat better: For if any Vertue be received from the *Medicine*, it hath the lesse way, and the lesse time to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, wherein the *Medicine* is *Infused*; VVhich I have little Opinion of, because the *Seed* (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety*: But it wil be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect may have more force than the rest; Brcause the *Medication* is oft renewed; VVhereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborn to receive those fine *Impressions*; And besides, (as I have said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in severall places, one above the other; And the *Filling* of the *Holes* with *Dung* mingled with the *Medicine*.

And the *Watring* of those *Lumps* of *Dung*, with *Squirts* of an *Infusion* of the *Medicine* in *Dungged Water*, once in three or foure *Dayes*.

0.2. The first of these is the
fact that the number of
cases of the disease is
very small. It is estimated
that only about 100 cases
occur each year in the
United States. This is a
very small number compared
to the number of cases of
other diseases. The second
fact is that the disease is
usually fatal. It is estimated
that about 80% of the cases
die. This is a very high
mortality rate. The third
fact is that the disease is
usually caused by a virus.
This is a very common
type of pathogen. The
virus is usually spread by
contact with an infected
person. It is also possible
to become infected by
contact with an infected
animal. The disease is
usually diagnosed by
examining a sample of the
patient's blood. The virus
can be detected by using
special tests. The disease
is usually treated with
antiviral drugs. These
drugs help to reduce the
severity of the disease and
may help to prevent
further spread of the virus.
The disease is usually
prevented by vaccination.
There is a vaccine available
for the disease. It is
usually given to children
at the age of 12 months.
The vaccine is very effective
in preventing the disease.
It is estimated that about
90% of the children who
receive the vaccine are
protected from the disease.
The disease is a very
serious one. It is important
to be aware of the signs
and symptoms of the disease
and to seek medical help
if you suspect that you
or your child may have
the disease. The disease
is usually fatal, so it is
important to act quickly.
The disease is usually
caused by a virus, so it
is important to avoid contact
with infected persons and
animals. The disease is
usually diagnosed by
examining a sample of the
patient's blood. The virus
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NATURAL HISTORIE.

VI Century.



VR *Experiments* wee take care to be, (as wee have often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vse*, or of *Discovery*: For wee hate *Impostures*; And despise *Curiosities*. Yet because wee must apply our Selves somewhat to

Others, wee will set downe some *Curiosities* touching *Plants*.

It is a *Curiositie* to have severall *Fruits* upon one *Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may have, upon the same *Tree*, Ripe *Fruits* all Sommer. This is easily done, by Grafting of severall *Cions*, upon severall Boughes, of a Stocke, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all Kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diversitie* of *Fruits* must be such, as will graft upon the same Stock. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenge*s, upon the same Stock, upon which you graft *Plums*.

It is a *Curiosity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long as a Cane; Or as round as a Sphere; Or formed like a Crosse. You may have also *Apples*, in the forme of *Peares*, or *Lemons*. You may have also *Fruit* in more Accurate *Figures*; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must understand, that you make the Mould big enough, to containe the whole *Fruit*, when it is grown to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concave, and so to be turned into the *Shape* desired; As it is in Mould workes of Liquid things. Some doubt may be conceived,

Experiments
in Confort
touching
Curiosities
about *Fruits*,
and *Plants*.

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ceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiosity*, to have *Inscriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphically.

—*Tenerisque meos incidere Amores*
Arboribus, crescent illæ, crescetis Amores.

504 You may have *Trees* apparelled with *Flowers*, or *Herbs*, by *Boring* Holes in the *Bodies* of them, and Putting into them *Earth* holpen with *Mucke*, and *Setting* *Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wild-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would be tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it selfe.

505 It is an ordinary *Curiosity*, to *Form* *Trees* and *Shrubs*, (as *Rosemary*, *Juniper*, and the like,) into *Sundry Shapes*; Which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great *Castles* made of *Trees* upon *Frames* of *Timber*, with *Turrets*, and *Arches*, were anciently matters of Magnificence.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their Preheminence. It is observed by some, that *Gilly-Flowers*, *Sweet-Williams*, *Violets*, that are Coloured, if they be neglected, and neither Watered, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *White*, with much culture, may turne Coloured. For this is certaine, that the *White* Colour commeth of Scarcity of Nourishment; Except in *Flowers* that are onely *White*, and admit no other Colours.

507 It is good therefore, to see what *Natures* doe accompany what Colours; For by that you shall have Light, how to induce Colours, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than *Flowers* of the same kinde Coloured; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. We finde also, that *Blossomes* of *Trees* that are *White*, are commonly Inodorate; As *Cherries*, *Peares*, *Plums*; Whereas those of *Apples*, *Crabbs*, *Almonds*, and *Peaches*, are Blushy, and Smell sweet. The Cause is, For that the Substance that Maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to be of so dainty Colours. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it be in such *Plants*, as are very Succulent; Whereby they need rather to be scanted in their Nourishment, than replenished, to have them sweet. As wee see in *White Satyrion*, which is of a Dainty Smell; And in *Bean-Flowers*, &c. And againe, if the *Plant* be of Nature, to put forth *White* *Flowers* onely, and those not thinne, or drie, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lillies*.

508 Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the Coloured; As wee see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The Cause is, for that the

the *Coloured* are more juyced, and courier juyced; And therefore not so well and equally Concocted; But the *White* are better proportioned to the Digestion of the *Plant*.

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, *Damascins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberrie*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdaccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Overwatry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste, And therefore all your dainty *Plummes*, are a little drie, and come from the Stone; As the *Muske-Plumme*, the *Damascin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the Nature of *Berries*, sweetest such as are *Paler*; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more lowre.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower* which is the most Common;) And sow it; And there will come up *Gilly-Flowers*, some of one Colour, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price; As *Purple*, *Carnation* of severall *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it be contiguous, and in one Bed, there are very severall *Juyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which do come up *Purple*, doe alwayes come up Single; The *Juyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leaf*. This *Experiment* of severall Colours, comming up from one *Seed*, would bee tried also in *Larkes-Fott*, *Monkes-Hood*, *Poppey*, and *Hollioke*.

Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skin. There is a *Peach* also, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is somewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* sides, are Coloured *Red* within. The *Cause* may be enquired.

The generall Colour of *Plants* is *Greene*, which is a Colour that no *Flower* is of. There is a *Greenish Prime-Rose*, but it is *Pale*, and scarce a *Greene*; The *Leaves* of some *Trees* turne a little *Murry*, or *Reddish*; And they be commonly *Young Leaves* that doe so; As it is in *Oakes*, and *Vines*, and *Haste*. *Leaves* rot into a *Yellow*; And some *Hollies* have part of their *Leaves* *Yellow*, that are, (to all seeming,) as *Fresh* and *Shining*, as the *Greene*. I suppose also, that *Yellow* is a lesse *Succulent Colour*, than *Greene*: And a degree nearer *White*. For it hath beene noted, that those *Yellow Leaves* of *Holly* stand ever towards the *North*, or *North-East*. Some *Roots* are *Yellow*, as *Carrets*; And some *Plants* *Bloud-Red*, *Stalke* and *Leaf*, and all; As *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solis*, &c. And some have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure* and a *Fair Purple*, are never found in *Leaves*. This sheweth that *Flowers* are made of a refined *Juyce* of the Earth; And so are *Fruits*: But *Leaves* of a more Coarse, and Common.

It is a *Curiosity* also to make *Flowers* *Double*; Which is effected by Often Removing them into *New Earth*; As on the contrary Part, *Double Flowers*,
L by

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by neglecting, and not Removing, prove *Single*. And the Way to doe it speedily, is to sow or set *Seeds*, or *Slips of Flowers*; And as soone as they come up, to remove them into new Ground, that is good. Enquire also, whether *Inoculating of Flowers*, (as *Stock Gilly-Flowers*, *Roses*, *Musk-Roses*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Blossomes*: But that *Tree* beareth no *Fruit*; And, it may be, that the same Meanes, which applyed to the *Tree*, doth extremely accelerate the Sap to rise, and Breake forth; Would make the *Tree* spend it selfe in *Flowers*, and those to become *Double*; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Blossomes Blush-Coloured*.

514 The *Making of Fruits* without *Core* or *Stone*, is likewise a *Curiositie*; And somewhat better: Because whatsoever maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, have the *Pith* finely taken forth, (and not altogether, but some of it left, the better to save the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is said to be, of dividing a *Quick-Tree* downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

515 It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre-Fruit* grafted upon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit*, sweeter, and more void of the harsh Matter of *Kernels*, or *Seeds*,

516 It is reported, that not onely the *Taking out* of the *Pith*, but the *Stopping* of the *Juyce* of the *Pith*, from Rising in the Middest, and *Turning* it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should bore a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest.

517 It is reported, that *Trees watered* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree*, a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*.

Experiments
in Confort,
touching the
Degenerating
of Plants;
And of the
Transmutation
of them, one
into another.

THE Rule is certaine, that *Plants* for want of Culture, degenerate to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them degenerate. 2. *Drought*, unlesse the Earth of it selfe bee moist, doth the like. 3. So doth *Removing into worse Earth*, or *Forbearing to compost the Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Colwort* into *Rape* by Neglect, &c.

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519 Whatsoever *Fruit* useth to be set upon a *Root*, or a *Slip*, if it be *sowne*, will degenerate. *Grapes sowne*, *Figs*, *Almonds*, *Pimgranate Kernels sowne*, make the *Fruits degenerate*, and become *Wilde*. And againe, Most of those *Fruits* that use to be grafted, if they be set of *Kernels*, or *Stones*, degenerate. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones* Set, than upon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the *Stocke*, though it giveth a finer Nourishment, yet it giveth a scanter, than the Earth at large.

520 *Seeds*, if they bee very *Old*, and yet have strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilful Gardiners make trial of the *Seeds*, before they buy them, whether they be good or no, by Putting them

them in Water gently Boyled ; And if they bee good, they will sprout within halfe an Houre.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbs* seeme to have small Affinity ; but *Basill* is almost the onely Hot *Herbe*, that hath Fat and Succulent *Leaves* ; Which Oylinesse, if it be drawne forth by the *Sunne*, it is like it will make a very great Change.

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *wild Vines* : Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualificth the Earth, to put forth a *Vine* of it selfe.

It is not impossible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde ; As that *Beech* hath put forth *Birch* ; Which, if it be true, the *Cause* may be, for that the old *Stub* is too scant of *Juyce*, to put forth the former *Tree* ; And therefore putteth forth a *Tree* of smaller kinde, that needeth lesse Nourishment

There is an Opinion in the Countrey, that if the same *Ground* be oft sown, with the *Graine* that grew upon it, it will, in the end, grow to bee of a baser kinde.

It is certaine, that in *Serile Reares*, *Corne sowne* will grow to an Other Kinde.

*Grandia saepe quibus mandavimus Hordea Sulcis,
Infelix Loliam, & steriles dominantur Avena.*

And generally it is a Rule, that *Plants* that are brought forth by *Culture*, as *Corne*, will sooner change into other *Species*, than those that come of themselves : For that *Culture* giveth but an Adventitious Nature, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is inter *Magnalia Naturæ* : For the *Transmutation* of *Species* is, in the vulgar philosophy, pronounced Impossible : And certainly it is a thing of difficultie, and requireth deep Search into Nature : But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibilitie is to bee rejected ; And the meanes thereof to be found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another ; As *Caterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* in another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well have a *Transmigration* of *Species*. Wherefore wanting *Instances*, which doe occurre, wee shall give Directions of the most likely *Tryalls* : And generally, we would not have those,

that read this Worke of *Sylva Sylvarum*, account it strange, or thinke that it is an Over-Haste, that wee have set down Particulars untried; For contrariwise, in our owne Estimation, wee account such Particulars, more worthy, than those that are already tried and knowne. For these Later must be taken as you finde them; But the other doe levell Point blank at the *Inventing* of Causes, and *Axiomes*.

526

First, therefore you must make account, that if you will have one *Plant* change into another, you must have the *Nourishment* over-rule the *Seed*: And therefore you are to practise it by *Nourishments* as contrary, as may bee, to the *Nature* of the *Herbe*; So nevertheless as the *Herb* may grow, And likewise with *Seeds* that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them upon *Tops* of Hills, and *Champaignes*; And such *Plants* as require much Moisture, upon Sandie and very drie Grounds. As for Example, *Marsh-Mallows*, and *Sedge*, upon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, & *Brakes* upon a *Wet* or *Marsh Ground*. This I conceive also, that all *Esculent* & *Garden Herbs*, set upon the *Tops* of Hills, will prove more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wild Herbs* you may make *Sallet Herbs*. This is the first Rule for *Transmutation* of *Plants*.

527

The second Rule shall bee to bury some few *Seeds*, of the *Herb* you would change, amongst other *Seeds*; And then you shall see, whether the *Juyce* of those other *Seeds* doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce Seed* amongst *Parsly Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forain *Seed*.

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The third Rule shall be, the making of some *Medley* or *Mixture* of *Earth*, with some other *Plants Bruised*, or *Shaven*, either in *Leaf* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort Leaves* stamped, and set in it *Artichokes*, or *Parsnips*; So take *Earth* made with *Marjoram*, or *Origanum*, or *Wild-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Proces of Nature still will be, (as I conceive,) not that the *Herbe* you worke upon, should draw the *Juyce* of the Forrain *Herbe*; (For that opinion we have formerly rejected;) But there will be a New *Confection* of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herb*.

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The fourth Rule shall be, to mark what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to Pot it, or to Vessell it; And in that to set the *Seed* you would change: As for Example, take from under Walls, or the like, where *Nettles* put forth in abundance, the *Earth* which you shall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-flowers*, &c. Or sow in the *Seeds* of them; And see what the Event will be: Or take *Earth*, that you have prepared to put forth *Mushromes*, of it selfe, (whereof you shall finde some *Instances* following;) And sow it in *Purslane-Seed*, or *Lettuce-Seed*, for in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of *Nourishment*, will alter the new *Seed*.

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The fifth Rule shall be, to make the *Herb* grow contrary to his *Nature* ; As to make *Ground-Herbs* rise in *Height* : As for example ; Carry *Camomile*, or *Wild-Thyme*, or the *Green Strawberry*, upon Sticks, as you doe *Hops* upon Poles ; And see what the Event will be.

The sixth Rule shall be to make *Plants* grow out of the *Sunne*, or open *Aire* ; For that is a great Mutation in *Nature* ; And may induce a Change in the *Seed* : As barrell up *Earth*, and sow some *Seed* in it, and put it in the Bottom of a Pond ; Or put it in some great hollow *Tree* ; Tria also the Sowing of *Seeds* in the Bottomes of Caves ; And Pots with *Seeds* sowne, hanged up in Wels, some distance from the *Water*, and see what the event will be.

[T is certaine, that *Timber-Trees* in *Coppice Woods*, grow more upright, and more free from *Under-Boughs*, than those that stand in the *Fields* : The Cause whereof is, for that *Plants* have a *Naturall Motion*, to get to the *Sunne* ; And besides, they are not glutted with too much *Nourishment* ; For that the *Coppice* shareth with them ; And *Repletion* ever hindereth *Stature* ; Lastly, they are kept warm ; And that ever in *Plants* helpeth *Mounting*.

Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in *Height* without *Side-Boughs*, till they come towards the *Top*. The Cause is, partly *Heat* ; And partly *Tenuity* of *Juyce* ; Both which send the *Sap* upwards. As for *Juniper*, it is but a *Shrub*, and groweth not bigge enough in *Body*, to maintaine a tall *Tree*.

It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will dwarse it, and make it spread. The Cause is plain ; For that all Things that grow, will grow as they find *Room*.

Trees are generally set of *Roots*, or *Kernels* ; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take ; And those that take, (as is reported) will be *Dwarf-Trees*. The Cause is, for that a *Slip* draweth *Nourishment* more weakly, than either a *Root*, or *Kernell*.

All *Plants* that put forth their *Sap* hastily, have their *Bodies* not proportionable to their *Length* ; And therefore they are *Winders* and *Creepers* ; As *Ivy*, *Briony*, *Hops*, *Woodbine* : Whereas *Dwarfing* requireth a slow Putting forth, and lesse *Vigour* of *Mounting*.

The *Scripture* saith, that *Salomon* wrote a *Naturall History* : from the *Cedar* of *Libanus*, to the *Mosse* growing upon the *Wall* : For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant* ; And (as it were) the *Mould* of *Earth*, or *Barke*.

Mosse groweth chiefly upon *Ridges* of *Houses*, tiled or thatched ; And upon the *Crests* of *Walls*. And that *Mosse* is of a lightsome and pleasant *Green*. The Growing upon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of *Moisture* and *water*, so on the other side the *water* must but *Slide*, and not stand or *Poole*. And the Growing upon *Tiles*, or *Walls*, &c. is caused, for that those dried *Earths*, having not *Moisture* sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse* : Though when by *Age*, or otherwise, they grow to relent and resolve, they sometimes

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Experiments
in Consort
ouching the
Procerity, and
Lownesse, and
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dwarfing of
trees.

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Experiments
in Consort,
touching the
Rudiments of
Plants, and
of the Excre-
scences of
Plants, or Su-
per-Plants.

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so metimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little *Stalkes*, besides the low *Thrumme*.

538 *Mosse* groweth upon *Alleyes*, especially such as lie Cold, and upon the North; As in divers *Tarrasses*: And againe, if they be much troddon; Or if they were at the first, gravelled; For wheresoever *Plants* are kept downe, the Earth putteth forth *Mosse*.

539 Old *Ground*, that hath been long unbroken up, gathereth *Mosse*: And therefore Husbandmen use to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth upon the same *Cause*; For that the more *Sparing* and *Starving* Juyce of the Earth, insufficient for *Plants*, doth breed *Mosse*.

540 Old *Trees* are more *Mossie*, (farre) than *Young*; For that the *Sap* is not so franke as to rise all to the *Boughes*, but tyeth by the *Way*, and putteth out *Mosse*.

541 *Fountaines* have *Mosse* growing upon the *Ground* about them; *Muscoli Fontes*; —————

The *Cause* is for that the *Fountaines* draine the *Water* from the *Ground* Adjacent, and leave but sufficient *Moisture* to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

542 The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the *Juyce* of the *Tree*, that is Excerned, and doth not Assimilate. And upon great *Trees* the *Mosse* gathereth a *Figure*, like a *Leafe*.

543 The *Moister* Sort of *Trees* yeeld little *Mosse*; As we see in *Asps*, *Poplars*, *Willows*, *Beeches*, &c. Which is partly caused for the Reason that hath been given, of the francke Putting up of the *Sap* into the *Boughes*; And partly, for that the *Barks* of those *Trees*, are more Close, and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both upon *Body* and *Boughes*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so franckly, as it should doe.

545 We have said heretofore, that if *Trees* be *Hide bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* bee bound in with *Cords*, or some *Outward Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that it stand Bleake, and upon the Cold Winds. It would also be tried, whether, if you cover a *Tree*, somewhat thick upon the top, after his *Powling*, it will not gather more *Mosse*. I thinke also, the *Watriing* of *Trees* with Cold *Fountain* *Water*, will make them grow full of *Mosse*.

546 There is a *Mosse* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. Quere particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I have set down the last *Experiments*, how to multiply, and call on *Mosses*.

Next unto *Mosse*, I will speake of *Mushromes*; VWhich are likewise an *Imperfect Plant*. The *Mushromes* have two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they come up so *hastily*, As in a *Night*, and yet they are *Insowne*. And therefore such as are *Vpstarts* in *State*, they call

call, in reproach, *Mushromes*. It must needs bee therefore, that they be made of much *Moysture*; And that *Moisture* Fat, Grosse, and yet somewhat *Concocted*. And (indeed) wee finde, that *Mushromes* cause the *Accident*, which wee call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyson. And this sheweth, that they are *VVindy*; And that *Windinesse* is Grosse, and Swelling; Not Sharp, or Griping. And upon the same reason *Mushromes* are a venereous Meat.

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the *Moistest* of *Trees*;) cut small, and cast into *Furrowes* well dunged, will cause the *Ground* to put forth *Mushromes*, at all *Seasons* of the *Year*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, resolved in *Water*.

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It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, be set on *Fire*, in the *Showry Season*, it will put forth great Store of *Mushromes*.

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It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Mushromes*. And we know that *Harts-Horne* is of a Fat and *Clammie* Substance: And it may bee *Oxe-Horne* would doe the like.

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It hath beene reported, though it be scarce credible, that *Ivy* hath growne out of a *Stags-Horne*; which they suppose did rather come from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Precedures* of *Earth*, (as *Tile*, *Stene*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may bee *Triall* made of some *Seeds*, as that *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

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There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Troads-Stoole*: But it is not *Esculent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten-Trees*: And therefore seemeth to take his *Juyce* from *Wood Putrified*. Which sheweth, by the way, that *Wood-Putrified* yeeldeth a franke *Moisture*.

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There is a *Cake* that groweth upon the *Side* of a *Dead Tree*, that hath gotten no Name, but it is large, and of a *Chefnur Colour*, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their *Putting forth*; No more than the *Carcasses* of *Mens Bodies* that put forth *Haire*, and *Nails*, for a *Time*.

552

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the *Breaking*: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*.

553

There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Asbes*. It hath a strange *Propertie*; For in *Warne Water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne *Colour*. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a *Mollifying*, and *Lenifying Vertue*.

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There is a Kind of *Spongie-Excrecence*, which groweth chiefly upon the *Roots* of the *Lasex-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agarick*. It is famous in *Physick* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*. But *Offensive* to the *Stomacke*; And in *Taste* it is, at the first, *Sweet* and after *bitter*.

556

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They have an idle *Tradition*, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her *Excrement*: which falling upon a *Bow* of a *Tree*, that hath some *Rift*, putteth forth the *Misseltoe*. But this is a *Fable*; For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For *First*, it is found but upon certain *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit and feed upon them. It may be, that *Bird* feedeth upon the *Misseltoe-Berries* and so is often found there; Which may have given occasion to the *Tale*. But that which maketh an *End* of the *Question*, is, that *Misseltoe* hath been found to put forth under the *Boughes*, and not (onely) above the *Boughes*: So it cannot be any *Thing* that falleth upon the *Bough*. *Misseltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hassles*; And rarely upon *Oakes*; The *Misseltoe* whereof is counted very *Medicinall*. It is ever *greene*, *Winter* and *Summer*; And beareth a *white Glistering Berry*: And it is a *Plant*, utterly differing from the *Plant* upon which it groweth. Two things therefore may be certainly set downe: *First*, that *Super-fatation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: *Secondly*, that that *Sap* must be such, as the *Tree* doth exerne, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more *Fat* and *Unctuous*, than the *Ordinary Sap* of the *Tree*; Both by the *Berry*, which is *Clammie*; And by that it continueth *greene*, *Winter* and *Summer*, which the *Tree* doth not.

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This *Experiment* of *Misseltoe* may give *Light* to other *Practices*. Therefore *Triall* would be made, by *Ripping* of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the *Wound* every *Day*, with *Warne-Water Dunged*, to see if it would bring forth *Misseltoe*, or any such like *Thing*. But it were yet more likely to trie it, with some other *Watring* or *Anointing*, that were not so *Naturall* to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such *Things* as kill not the *Bough*.

558

It were good to trie, what *Plants* would put forth, if they bee forbidden to put forth their *Naturall Boughs*: Poll therefore a *Tree*, and cover it, some thickness, with *Clay* on the *Top*; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would bee closed with somewhat, that is not so *Naturall* to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559

A *Man* may count the *Prickles* of *Trees* to be a kinde of *Excrecence*, For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Frier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose Berry*; *Berber*; These have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are, *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small *Venomous Prickle*; So hath *Borrage*, but harmelesse. The *Cause* must be *Hastie Putting forth*; *Want of Moisture*; And the *Clofenesse* of the *Barke*; For the

the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moisture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; and therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same *Cause*.

There be also *Plants*, that though they have no *Prickles*, yet they have a *Kinde* of *Downey* or *Velvet Rine*, upon their *Leaves*; As *Rose-Campion*, *Stock-Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, have been applyed, (with successe,) to the *Wrests* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a *Sanative vertue*, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another *Kinde* of *Excrecence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And *Countrey People* have a kind of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a *Signe* of a *Pestilent Yeare*; Which is a likely Thing, because they grow of *Corruption*.

There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of divers *Colours*; Which if you cut, you shall ever finde full of little white *Wormes*.

It is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry Kinds* of *Herbs*: But some *Time* is required, for the *Germination*; For if it bee taken, but from a *Fathome* deep, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it self; As if the *Mould* bee *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* bee *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is *Common Experience*, that where *Alleyes* are close *Garvelled*, the *Earth* putteth forth, the first yeare, *Knot-Grasse*, and after *Spire-Grasse*. The *Cause* is, for that the *Hard Gravell*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the *Ordinary Grasse* commeth up.

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and *Potted*, will put forth *Herbs* of a *Fat* and *Iuicie Substance*; As *Penny-wort*, *Purflane*, *Housleeke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the *Bottom*; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those *Small ones*: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so have a *Number* of other *Herbs* that grow in *Ponds*.

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Experiments
in Consort,
touching the
Producing of
Perfect Plants
without Seed.

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It is reported by some of the *Ancients*, and some *Moderne Testimonie* likewise, that there be some *Plants*, that grow upon the Top of the *Sea*; Being supposed to grow of some *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* stirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium*, (*Sea-Thistle*,) both the *Roots*; but have *Sea-weed* under the *Water*, the *Sea-Thistle* but upon the *Shore*.

569

The *Ancients* have noted, that there are some *Herbs*, that grow out of *Snow*, laid up close together, and *Putrified*; And that they are all *Bitter*; And they name one especially, *Flomus*, which we call *Moth-Mullein*. It is certain, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewise put forth *Plants*.

570

The *Ancients* have affirmed, that there are some *Herbs*, that grow out of *stone*; Which may be, for that it is certaine, that *Toads* have beene found in the Middle of a *Free-Stone*. We see also, that *Flints*, lying above *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow upon *Walls*; But whether upon the *Maine Bricke*, or *Stone*, or whether out of the *Lime*, or *Chincks*, is not well observed; For *Elders* and *Asbes* have beene seene to grow out of *Steeple*s: But they manifestly grow out of *Clefts*; In so much as when they grow bigge, they will dis-joyne the *Stone*. And besides, it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould* or *Earth*. It hath likewise been found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571

In some *Mines* in *Germany*, as is reported, there grow in the *Bottom* *Vegetables*; And the *Worke-Folks* use to say, they have *Magical Vertue*; And will not suffer men to gather them.

572

The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwayes) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*.

573

It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment 29*.

Experiments
in Consort,
touching
Forraine
Plants.

574

It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast upon some *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, confused together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other:

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Plants brought out of *Hot Countries*, will endeavour to put forth, at the same *Time*, that they usually doe in their owne *Climate*; And therefore to preserve them, there is no more required, than to keep them from the Injury of Putting back by *Cold*. It is reported also, that *Graine* out of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary *Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annually*; And so the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Removed.

576

Many *Plants*, which grow in the *Hotter Countries*, being set in the *Colder*,

der, will neverthelesse, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come up and abide most part of the *Summer*; As wee finde it in *Orange*, and *Limon-Seeds*, &c. The *Seeds* whereof sowne in the End of *April*, will bring forth excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

T Here be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And others which come more *Late* in the *Yeare*. The *Flowers* that come early, with us, are, *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffodillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*, Which therefore, (as it should seeme,) have a quicker *Perception* of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* have; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pincks*, *Roses*, *Flowerdeluces*, &c. and the latest are *Gilly-Flowers*, *Holly-Oakes*, *Larkes-Foot*, &c. The *Earliest Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of such *Trees*, as have much *Moisture*, either *Watry*, or *Oily*. And therefore *Circus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rie* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Dire Ones*, that are used for *Horse-Meate*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The *Earliest Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them, *Damascins*, and most *Kinde* of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-berries*, *Heps*, *Medlars*, *Servises*, *Cornelians*, &c.

It is to be noted. that (commonly) *Trees* that ripen latest, *Blossome* soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke* of *Providence*, that they blossome so soone; For otherwise, they could not have the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come *twice* a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth *twice* a *Yeare*; Especially the *Double White*; And that also is a *Plant* full of *Moisture*. *Roses* come *twice*, but it is not without *Cutting*, as hath beene formerly said.

In *Muscovia*, though the *Corne* come not up, till late *Spring*, yet their *Harvest* is as *Early* as *Ours*. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are *Earlier*, and *Later*, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall have *Red-Roses*, and *Damask-Roses*, come together; And likewise the *Harvest* of *Wheat* and *Barley*. But this happeneth ever, for that the *Earlier* stayeth for the *Later*; And not that the *Later* commeth sooner.

There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orange* hath the like with us, for a great Part of *Summer*;

Experiments
in Consort,
touching the
Seasons in
which Plants
come forth.

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Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with they *Cold* of the *Winter*: And therefore this *Circle of Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582

Some *Herbs* are but *Annually*, and die, *Root* and all, once a *Yeare*; As *Borage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many *Yeares*; As *Hyssope*, *Germander*, *Lavender*, *Fennell*, &c. The *Cause* of the *Dying* is *double*; The first is the *Tendernesse* and *Weaknesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

Experiments
in Comfort,
touching the
Lasting of
Herbs and
Trees.

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The *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oaks*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Coleworts*, *Pompions*, which are *Herbs* of the *Largest* *Size*, are of *small* *Durance*; Whereas *Hyssope*, *Winter-Savory*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantity* of their *Sap* and *Iuyce*; Being well munit by their *Barke* against the *Injuries* of the *Aire*: But *Herbs* draw a *Weak Iuyce*; And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Stickie Stalke*.

584

Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chestnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oyline* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

585

Trees that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaves* Early, or shed them betimes. The *Cause* is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other loose, and more easily resolved. And the same *Cause* is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is *Acide*, more than those whose *Fruit* is *sweet*.

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Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a *Renovation* of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Inso much as *Annually* *Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more *Yeares* than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Overgrowne-Trees*, in *Church-yards*, or neare *Ancient Building*, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full *Height*.

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Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary *Period*; As to make a *Stalke* of *Wheate*, &c. last a whole *yeare*. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the *Shade*, and encompassed with a *Case* of *Wood*, not touching the *Straw*, to keep out open *Aire*.

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As for the *Preservation* of *Fruits*, and *Plants*, as well upon the *Tree*, or *Stalk*,

as gathered, we shall handle it under the Title of Conservation of Bodies.

THE *Particular Figures* of *Plants* we leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* and *Herbs*, in the Growing forth of their *Boughs*, and *Branches*, are not *Figured*, and keepe no Order. The *Cause* is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casuall, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sollow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of *ævis*, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spread and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The *Cause* or Scattering the *Boughes*, is the Hasty breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but Branch near the *Ground*. The *Cause* of the *Pyramis*, is the Keeping in of the *Sap*; long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The *Spreading* is caused by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once.

Experiments
in Consort,
touching the
severall *Fi-
gures* of
Plants.

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There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of Order, in the Putting forth of their *Leaves*: For they have *Foynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pinks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Clofenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is drie: As *Fennell-Stalke*, *Stubble*, and *Canes*.

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Flowers have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Bryer-Roses*, *Single-Musk-Roses*, *Single-Pinks*, and *Gilly-Flowers*, &c, which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have four *Leaves*. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifoile*, &c. We see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Five Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round; Some Long; None Square; and many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinks*, and *Gilly-Flowers*, to be like the inequality of *Oak-Leaves*, or *Vine-Leaves*, or the like; But they seldome or never have any small *Purles*.

590

OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossoms*; as *Apples*, *Pears*, *Plums*, *Cherries*, *White-Thorn*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth early in the Spring, and ripen very late; As most of the *Particulars* before mentioned;) Or else an *Oylie Fuyce*, which is apter to put out *Flowers*, than *Leaves*.

Experiments
in Consort,
touching some
Principall
Differences in
Plants.

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Of *Plants*, some are *Green* all *Winter*; Others cast their *Leaves*. There are *Green* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypress*, *Juniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the *Holding Green*; is the Close and Compact *Sub-
stance*

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stance of their *Leaves*, and the *Pedicles* of them. And the Cause of that again, is either the *Tough* and *Viscous Juice* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous* a *Juyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is *Tough*, and not *Fragile*, as we see in other small *Twigs* drie. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavy *Wood*, as we see it in *Bowes*. *Eugh* is a *Strong* and *Tough Wood*, as we see it in *Bowes*. Of the Second Sort is *Juniper*, which is a *Wood* *Odorate*; and maketh a hot *Fire*. *Bayes* is like-wise a *Hot* and *Aromaticall Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their *Density* appeareth, in that, either they are *Smooth* and *Shining*, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are *Hard* and *Spirie*, as in the rest. And *Triall* would be made of *Grafting* of *Rose-Mary*, and *Bayes*, and *Box* upon a *Holly-Stocke*; Because they are *Plants* that come all *Winter*. It were good to trie it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap* of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted upon a *Holly*, will prove both an *Earlier*, and a *Greater Tree*.

593 There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some, that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry*, *Walnut*, &c. And some *Shrubs*, (as *Juniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* also beare *Seeds*, (which is as the *Fruit*), and yet beare no *Flowers*; As *Purslane*, &c. Those that beare *Flowers*, and no *Fruit*, are few; As the *Double Cherry*, the *Sallow*, &c. But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then *Triall* would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be some *Plants*, that shoot still upwards, and can *Support* themselves; As the greatest Part of *Trees*, and *Plants*: There be some Other, that *Creep* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot support themselves; As *Vines*, *Ivy*, *Bryar*, *Briony*, *Wood-bines*, *Hop's*, *Climatis*, *Camomill*, &c. The Cause is, (as hath been partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all *Swift* and *Hastie Commers*.

Experiments
in Confort,
touching all
Manner of
Composts, and
Helps, of
Ground.

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THE first and most Ordinary *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, unlesse it be mingled. That of *Pigeons* for a *Garden*, as a small *Quantity* of *Ground*, Excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Ploughing* and *Sowing*; And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fatnesse* of the *Dung*: If the *Ground* be *Grazing Ground*; to spread it somewhat late, towards *Winter*; That the *Sunne* may have the lesse *Power* to drie it up. As for speciall *Composts* for *Gardens*, (as a *Hot Bed*, &c.) we have handled them before.

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The Second Kind of *Compost*, is, the *Spreading* of divers *Kinds* of *Earth*, As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As having most *Fatnesse*. And not *Heating*

Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Radiment of life. *Chalke* over-heateth the *Ground* a little. And therefore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say; that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *GraZing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tyred out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Creat Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth* as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, isto forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large *Hovell*, thatched, over some Quantity of *Ground*; Nay, if you doe but Planck the *Ground* over; it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a very good *Compost*; Especially if the *Pond* have been long uncleansed, and so the *Water* be not too Hungry: And I judge it will be yet better, if there be some *Mixture* of *Chalke*.

The Third *Helpe* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they be not meerly *Earth*: wherein *Ashes* excell; In so much as the Countries about *Aetna*, and *Vesuvius*, have a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnesse* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thinne, spred in a *Field* or *Garden*, is tried to be a very good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed Corne*, and sowed together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring* *Grounds* with *Compost-Water*; We have spoken of them before.

The Fourth *Helpe* of *Ground*, is, the *Suffering* of *Vegetables* to die into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it very Fruitfull. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lie scattered, and without *Mixture*, they rather make the *Ground* soure, than otherwise.

The Fifth *Help* of *Ground*, is *Heat* and *Warmth*. It hath been anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, upon the *Ground*: We see, that *Warmth* of *Wals* and *Enclosures*, mendeth *Ground*: We see also that *Lying open* to the *South*, mendeth *Ground*: We see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Covering* of the *Ground* with *Braks*, in the Beginning of the *Winter*, (whereof we spake in the last Experiment,) helpeth it not, by reason of the *Warmth*. Nay some very good

Husbands doe suspect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and *Laying* them on *Heaps*, (which is much used,) is no good *Husbandry*; For that they would keepe the *Ground* *Warne*.

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The *Sixth Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two *Manners*: The one by *Letting* in, and *Shutting* out *Waters*, at seasonable *Times*: For *Water*, at some *Seasons*, and with reasonable stay, doth good; But at some other *Seasons*, and with too long *Stay*, doth hurt. And this serveth onely for *Meadowes*, which are along some *River*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it traverse to spread the *Water*. And this maketh an excellent *Improvement*, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the *Fatnesse* of the *Earth*: But howsoever it profiteth much. Generally, where there are great *Overflowes*, in *Fens*, or the like, the *drowning* of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, till the *Weeds* and *Sedge* be growne up; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will never graze (to purpose) that yeare. Thus much for *Irrigation*. But For *Avoidances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, we shall speake of them in another Place.

NATU-



NATURALL HISTORY.

VII Century.



THe Differences between *Animate* and *Inanimate Bodies*, we shall handle fully under the Title of *Life*, and *Living Spirits*, and *Powers*. We shall therefore make but a brieft Mention of them in this Place. The Maine Differences are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine Differences between *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not onely *Branches*, but certaine *Cels* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not pervious one to another; As *Aire* is in *Snow*. The second Maine Difference is, that the *Spirits* of *Animate Bodies* are all in some degree, (more or lesse,) kindled and inflamed; And have a fine Commixture of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit Inflamed, or Kindled. And this Difference consisteth not in the *Heat* or *Coolnesse* of *Spirits*; For *Cloves* and other *Spices*, *Naptha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oile*, *Waxe*, or *Tallow*, &c.) but not *Inflamed*. And when any of those *Weake* and *Temperate Bodies* come to bee Inflamed, then they gather a much greater *Heat*, than others have *Un-inflamed*; besides their *Light*, and *Motion*, &c.

The Differences, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *Determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and propagation of their *Kinde*; which is not in *Bodies Inanimate*.

Experiments
in Consort,
touching the
Affinities, and
Differences,
between
Plants and
Inanimate
Bodies.

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The Differences between *Plants*, and *Metals* or *Fossiles*, besides those four before mentioned, (for *Metals* I hold Inanimate,) are these: First, *Metals* are more *Durable*, than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604

There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metals* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

605

Another speciall *Affinity* is between *Plants* and *Mould* or *Putrefaction*; For all *Putrefaction* (if it dissolve not in *Arefaction*) will in the end issue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes* and *Agaricke*, and other of those kinds, to be but *Moulds* of the *Ground*, *Wals*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldiness*, or *Rottenness*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which have *Affinity* with *Plants*, have this *Difference* from them; That they have no *Succession* or *Propagation*, though they *Nourish*, and have a *Period* of *Life*, and have likewise some *Figure*.

606

I left once, by chance, a *Citron* cut, in a close *Roome*, for three Summer-moneths, that I was absent; And at my Return, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have been some *Herbe*.

Experiments
in Confort,
touching the
Affinities, and
Differences, of
Plants, and
Living Crea-
tures. And
the *Confinchs*
and *Partici-*
ples of them.

607

THE *Affinities* and *Differences* between *Plants* and *Living Creatures*, are these that follow. They have both of them *Spirits Continued* and *Branched*, and also *Inflamed*: But first in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was also formerly said. And secondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radical Differences*. For the *Secondary Differences*, They are, as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are severed, and of themselves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nourish from their *Upper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Rootes*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermost; *Living Creatures* have them lowermost: And therefore it was said, not elegantly alone, but *Philosophically*; *Homo est Planta inversa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diversity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Sense*, which *Plants* have not. Eighthly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

608

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*, &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The nearest Approach of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In so much as, (that which is more strange,) they doubt not to report, that to keep the *Trees* upright from *Bending*, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be *Faigned*, or at least *Amplified*. Neverthelesse, I am apt enough to thinke, that this same *Binarium* of a
Stronger

Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Marks* of *Distinction* appeare: and it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

The *Participles* or *Confiners* between *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northern Countries*, there should be an *Herb* that groweth in the likeness of a *Lambe*, and feedeth upon the *Grasse*, in such sort, as it will bear the *Grasse* round about. But I suppose that the *Figure* maketh the *Fable*; For so we see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke*, and *Top*, doth prey upon the *Grasse* a good way about, by drawing the *Juyce* of the *Earth* from it.

609

The *Indian Fig* boweth his *Roots* down so low, in one year, as of it selfe it taketh *Root* again: And so multiplyeth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is, the *Plenty* of the *Sap*, and the *Softness* of the *Stalk*, which maketh the *Bough*, being overloaden, and not stiffely upheld, weigh down. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the continuall *Shade* increaseth the *Leaves*, and abateth the *Fruit*; which nevertheless is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleness* and *Gentleness* of the *Juyce* of that *Plant*, being that which maketh the *Boughs* also so Flexible.

Experiments
Promiscuous
touching
Plants.

610

It is reported by one of the *Ancients*, that there is a certain *Indian Tree*, having few, but very great, *Leaves*, three *Cubits* long, and two broad; And that the *Fruit* being of good Taste, groweth out of the *Barke*. It may be, there be *Plants* that pour out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*; or to put forth *Stalks* to the *Fruit*. With us *Trees* generally have smal *Leaves* in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberie*, and *Sycamore*; And the least are those of the *Willow*, *Birch*, and *Thorn*. But there be found *Herbs* with far greater *Leaves* than any *Tree*; As the *Bur*, *Gourd*, *Cucumber*, and *Colewort*. The *Cause* is, (like to that of the *Indian Fig*, the hasty and plentiful Putting forth of the *Sap*.

611

There be three *Things* in use for *Sweetness*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce known, and little used. It is found in *Canes*: *Quare*, whether to the first *Knuckle*, or further up? And whether the very *Bark* of the *Cane* it self do yeeld *Sugar* or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Waxe*; And that hee hath known in the beginning of *May*, *Honey-Combes* empty of *Honey*, And within a fortnight when the sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the *Valleys* of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Tears* of some *Trees*, may be sweet. It may be also, that some sweet *Juyces*, fit for many uses, may bee concocted out of *Fruits*, to the Thickness of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the *Sun*, *Figs* and *Corrans*: The *Meanes* may be enquired.

612

The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which

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which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Bark*, (being as it seemeth corroded by the *Salt*,) and grasping the *Sands* like a *Crab*; Which nevertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There be of *Plants*, which they use for *Garments*, these that follow. *Hemp*, *Flaxe*, *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*,) *Sericum*, which is a *Growing Silk*; They make also *Cables* of the *Bark* of *Lime-Trees*. It is the *Stalk* that maketh the *Filaceous Matter*, commonly; And sometimes the *Down* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosie-Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noon*; which the *Inhabitants* of those *Countries* say, is a *Plant* that *Sleepeth*. There be *Sleepers* enough then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Mossie* or *Downie Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; whereof *Witches*, and *Impostours* make an ugly *Image*, giving it the Form of a *Face* at the *Top* of the *Root*, and leave those *Strings* to make a broad *Beard* down to the *Foot*. Also there is a *Kinde* of *Nard*, in *Creet*, (being a *Kinde* of *Phu*) that hath a *Root* hairy, like a *Rough-footed-Doves* foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the *Sap* hasteneth most to the *Aire*, and *Sun*: In the *Fibrous*, the *Sap* delighteth more in the *Earth*, and therefore putteth downward: And the *Hirsute* is a Middle between both; That besides the Putting forth upwards, and downwards; putteth forth in Round.

617 There are some *Tears* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the *Mornings*, the *Dew* being on, the *Tear* commeth forth, and, hangeth upon their *Beards*: Of this Sort is some kinde of *Ladanum*.

618 The *Irrigation* of the *Plane-Tree* by *Wine*, is reported by the *Ancients*, to make it *Fruitfull*. It would be tried likewise with *Roots*; For upon *Seeds* it worketh no great Effects.

619 The way to carry *Forrain Roots*, a long Way, is to vessell them close in *Earthen Vessels*. But if the *Vessels* be not very Great, you must make some Holes in the *Bottom*, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

620 The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the *Dryest*; And those Things, which are known to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Busbes* of other kindes, where commonly *Plants* do not thrive: Neither did it love the *Sun*: There might be one Cause of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. Quare, how far *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

621 It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devour the *Pith* and *Marrow* of it, and so make it Hollow, But Meddle not with the *Bark*, because to them it is bitter.

622 There were, in Ancient Time, *Vines*, of farr greater *Bodies*, then we know any; For there have been *Cups* made of them, and an *Image* of *Jupiter*. But it is like they were *Wilde-Vines*; For the *Vines* that they use for *Wine*, are so often

often Cut, and so much Digged and Dressed, that their Sap spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twiggs*, while they are green, so brittle, yet the *Wood* dried is extream Tough; And was used by the *Captains* of *Armies* amongst the *Romans*, for their *Cudgels*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make triall, whether *Plants* that use to be born up by Props, will put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Ivie*, *Woodbine*, &c.

623

Quinces, or *Apples*, &c. if you will keep them long, drown them in *Honey*; But because *Honey* (perhaps) will give them a Taste Overluscious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrup* of *Wine* only Boyled to Height. Both these would likewise be tried in *Orenges*, *Lemons*, and *Pomegranats*; For the *Powder* of *Sugar*, and *Syrup* of *Wine*, will serve for times more than once.

624

The *Conservation* of *Fruit* would be also tried in *Vessels*, filled with *Fine*, *Sand*, or with *Powder* of *Chalke*; Or in *Meal* and *Flower*; Or in *Dust* of *Oak-wood*; Or in *Mill*.

625

Such *Fruits*, as you appoint for *Long-Keeping*, you must gather before they bee full *Ripe*; And in a *Fair* and *Dry* *Day*, towards *Noon*; And when the *Winde* bloweth not *South*; And when the *Moon* is under the *Earth*; And in *Decrease*.

626

Take *Grapes*, and hang them in an *Empty Vessell*, well Stopped; and set the *Vessel*, not in a *Cellar*, but in some drie *Place*; and it is said, they will last long. But it is reported by some, they will keep better, in a *Vessel* half full of *Wine*, so that the *Grapes* touch not the *Wine*.

627

It is reported, that the *Preserving* of the *Stalk*, helpeth to preserve the *Grape*; Especially if the *Stalk* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

628

It is reported by some of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let down into *Wells* under *Water*, will keep long.

629

Of *Herbs* and *Plants*, some are good to eat *Raw*; As *Lettuce*, *Endive*, *Purslane*, *Tarragon*, *Cresses*, *Cucumbers*, *Musk-Melons*, *Radish*, &c. Others onely after they are *Boyled*, or have *Passed the Fire*, As *Parsley*, *Clary*, *Sage*, *Parsuips*, *Turnips*, *Asparagus*, *Artichoaks*, (though they also, being young are eaten *Raw*;) But a Number of *Herbs* are not *Esculent* at all; As *Wormwood*, *Grasse*, *Green-Corn*, *Centory*, *Hyssope*, *Lavender*, *Balm*, &c. The *Causes* are, for that the *Herbs* that are not *Esculent*, do want the two *Tastes*, in which *Nourishment* resteth; Which are, *Fat*, and *Sweet*; And have (contrariwise) *Bitter*, and *Overstrong* *Tastes*, or a *Juyce* so crude, as cannot be ripened to the degree of *Nourishment*. *Herbs*, and *Plants*, that are *Esculent* *Raw*, have *Fatness*, or *Sweetness*, (as all *Esculent* *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it must be such a *Fatness*, (for as for *Sweet* *Things*, they are in effect alwayes *Esculent*;) as is not *Over-grosse*, and *Loading* of the *Stomack*; For *Parsuips* and *Leeks* have *Fatness*; But it is too *Grosse* and *Heavy* without *Boyling*. It must be also in a Substance somewhat *Tender*; For we see *Wheat*, *Barley*, *Artichoaks*, are no good *Nourishment*, till they have passed the *Fire*; But the *Fire* doth ripen, and maketh them soft and tender; and so they become *Esculent*. As for *Radish*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nourishment*. And even some of those *Herbs*, which are not *Esculent*;

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lent, are notwithstanding *Poculent*; As *Hops*, *Broom*, &c. *Quare* what *Herbs* are good for *Drinke*, besides the two aforementioned; For that it may (perhaps) ease the Charge of *Brewing*, if they make *Beer* to require lesse *Malt*, or make it last longer.

631

Parts fit for the *Nourishment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaves*, they give no *Nourishment* at all, or very little: No more do *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *Watry* Substance commixed,) have more of the *Oily Substance*, And *Leaves*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Grains*, (we see) are half a year, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Month.

632

Plants (for the most part) are more strong, both in *Taste* and *Smell*, in the *Seed*, than in the *Leaf* and *Root*. The Cause is, for that in *Plants* that are not of a Fierce and Eager Spirit, the Vertue is increased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants* that are of a Fierce and Eager Spirit, they are stronger whilst the Spirit is inclosed in the *Root*; And the Spirits doe but weaken, and dissipate, when they come to the *Air* and *Sunne*; As we see it in *Onions*, *Garlick*, *Dragon*, &c. Nay there be *Plants* that have their *Roots* very Hot, and *Aromaticall*; And their *Seeds* rather *Inspide*; As *Ginger*. The Cause is, (as was touched before,) for that the Heat of those *Plants* is very Dissipable; which under the *Earth* is contained and held in; But when it commeth to the *Air*, it exaleth.

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The *Juyces* of *Fruits* are either *Watry*, or *Oylie*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Pear*, the *Cherry*, the *Pomegranate*, &c. And there are some others, which though they be not in use for *Drinke*, yet they appear to be of the same Nature; As *Plums*, *Servises*, *Mulberries*, *Rasps*, *Orenges*, *Lemons*, &c. And for those *Juyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaque admistis imitantur vitæ Sorbis.

And it may be *Hops* and *Brier-Berries* would doe the like. Those that have *Oylie Juyces*, are; *Olives*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Juyces* are all *Inflammable*. And you must observe also, that some of the *Watry Juyces*, after they have gathered Spirit, will Burn and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either Sharpnesse or Oyliness: Such as is the *Fig*, and the *Date*.

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It hath been noted, that most *Trees*, and specially those that bear *Mast*, are fruitfull but once in two yeares. The Cause (no doubt) is, the Expence of *Sap*; For many *Orchard Trees*, well Cultured, will bear divers yeares together.

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There is no *Tree*, which besides the *Naturall Fruit*, doth bear so many *Bastard Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certain *Oake-Berries*, sticking close to the *Body* of the *Tree* without *Stalk*. It beareth also *Misseltow*, though rarely. The Cause of all these may be, the Closenesse and Solidnesse of the *Wood*, and *Pith* of the *Oake*; Which maketh severall *Juyces* finde severall *Eruptions*. And therefore if you will devise to make any *Super-Plants*, you must ever give the *Sap* Plentifull Rising, and Hard Issue.

There

There are two *Excrefcences*, which grow upon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romanes* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agarick*, (whereof we have spoken before,) which groweth upon the *Tops* of *Oakes*; Though it be affirmed by some, that it groweth also at the *Roots*. I doe conceive, that many *Excrefcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into some *Prenaturall Substance*.

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The greater part of *Trees* bear *Most*, and *Best*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But some bear *Best* on the *Top-Boughs*; As *Crabs*, &c. Those that bear best below, are such, as *Shade* doth more good to than *Hurt*. For generally all *Fruits* bear best lowest; Because the *Sap* tireth not, having but a short *Way*: And therefore in *Fruits* spread upon *Walls*, the *Lowest* are the *Greatest*, as was formerly said; So it is the *Shade* that hindereth the *Lower-Boughs*; Except it be in such *Trees*, as delight in *Shade*; Or at least bear it well. And therefore, they are either *Strong Trees*, as the *Oak*; Or else they have large *Leaves*, as the *Wallnut* and *Fig*; Or else they grow in *Piramis*, as the *Pear*. But if they require very much *Sun*, they bear best on the *Top*; as it is in *Crabs*, *Apples*, *Plums*, &c.

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There be *Trees*, that bear best, when they begin to be *Old*; As *Almonds*, *Pears*, *Vines*, and all *Trees*, that give *Mast*. The *Cause* is, for that all *Trees*, that bear *Mast*, have an *Oily Fruit*; And *Young Trees*, have a more *Watry Juice*, and lesse *Concocted*; And of the same kinde also is the *Almond*. The *Pear* likewise, though it be not *Oylie*, yet it requireth much *Sap*, and well *Concocted*; For we see it is a *Heavie Fruit* and *Solid*; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Juyce* is better *Concocted*: And we see, that *Wine* is *Inflammable*; So as it hath a kinde of *Oylinefs*. But the most Part of *Trees*, amongst which are *Apples*, *Plums*, &c. bear best when they are *Young*.

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There be *Plants*, that have a *Milk* in them, when they are *Cut*; As *Figs*, *Old-Lettuce*, *Sow-Thistles*, *Spurge*, &c. The *Cause* may be an *Inception* of *Putrefaction*; For those *Milks* have all an *Acrimonic*; Though one would thinke they should be *Lenitive*. For if you write upon *Paper*, with the *Milk* of the *Fig*, the *Letters* will not be seen, untill you hold the *Paper* before the *Fire*, and then they wax *Brown*; which sheweth that it is a *Sharp* or *Fretting Juice*: *Lettuce* is thought *Poysonous*, when it is so *Old*, as to have *Milk*; *Spurge* is a kinde of *Poyson* in it Self; And as for *Sow-Thistles*, though *Coneys* eat them, yet *Sheep* and *Cattel* will not touch them; And besides, the *Milk* of them, rubbed upon *Warts*, in short time, weareth them away: Which sheweth the *Milk* of them to be *Corrosive*. We see also, that *Wheat*, and other *Corn sown*, if you take them forth of the *Ground*, before they sprout, are full of *Milk*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milk*, though not very white, which is of a great *Acrimony*. And *Saladine* hath a yellow *Milk*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

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Mushromes are reported to grow, as well upon the *Bodies* of *Trees* as upon their *Roots*, or upon the *Earth*: And especially upon the *Oake*. The *Cause* is, for that strong *Trees* are towards such *Excrefcences*, in the Nature of *Earth*; And therefore put forth *Mosse*, *Mushromes*, and the like.

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There is hardly found a *Plant*, that yeeldeth a *Red Fuyce*, in the *Blade*, or *Ear*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth chiefly in the *Island Soquotra*: The *Herbe Aramanthus*, (indeed,) is *Red* all over; And *Brasil* is *Red* in the *Wood*: And so is *Red Sanders*. The *Tree* of the *Sanguis Draconis*, groweth in the form of a *Sugar Loaf*. It is like, the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For we see that *Grapes*, and *Pomegranats*, are *Red* in the *Fuyce*, but are *Green* in the *Tear*: And this maketh the *Tree* of *Sanguis Draconis* lesser towards the *Top*; Because the *Fuyce* hasteneth not up; And besides, it is very *Astringent*; And therefore of *Slow Motion*.

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It is reported, that *Sweet Mosse*, besides that upon the *Apple Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Bark*, and hath little *Mosse*. The *Mosse* of the *Larix Tree* burneth also sweet, and sparkleth in the *Burning*. *Quare* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloes*, &c.

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The *Death* that is most without *Pain*, hath been noted to be, upon the *Taking* of the *Potion* of *Hemlock*; which in *Humanity* was the *Form* of *Execution* of *Capitall Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* used, hath some *affinitie* with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extream *Old Man*. I conceive it is lesse painfull then *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

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There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some never *Ripen* to be *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former *Kinde* have much and subtile *Heat*, which causeth *Early Sweetness*; The latter have a *Cold* and *Acide Fuyce*; which no *Heat* of the *Sun* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet* and yet *Astringent*.

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There be few *Herbs* that have a *Salt Taste*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltness*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Taste* remaineth not; For you shall have them *Bitter*, *Soure*, *Sweet*, *Biting*, but seldome *Salt*: But in *Living Creatures*, all those *High Tasts* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*; which is not very *Susceptible* of those *Tastes*; And the *Saltness* it self of *Bloud*, is but a light, and secret *Saltness*: And even among *Plants*, some doe participate of *Saltness*, as *Alga Marina*, *Samphire*, *Scorvy-Grafs*, &c. And they report, there is, in some of the *Indian Seas*, a *Swimming Plant*, which they call *SalgaZus*, spreading over the *Sea*, in such fort, as one would thinke it were a *Meadow*. It is certain, that out of the *Ashes*, of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

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It is reported by one of the *Ancients* that there is an *Herb* growing in the *Water*, called *Lincostis*, which is full of *Prickles*: This *Herb* putteth forth another small *Herb* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered between the *Prickles*, which *Putrified* by the *Sun*, *Germi*-*nateth*. But I remember also I have seen, for a great *Rarity*, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

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Barley, (as appeareth in the *Malting*,) being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a drie floor, will sprout, half an *Inch* long at least: And if it bee let alone, and

not

not turned, much more; untill the Heart be out. *Wheat* will doe the same. Trie it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driven: For it appeareth already, by that which hath been said, that *Earth*, is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will blow: Therefore trie whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come farre faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawn out of *Water*, than out of *Earth*. It may give some light also, that *Drink* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drink* together. Trie the same *Experiment* with *Roots*, as well as with *Graines*: As for Example, take a *Turnip*, and steep it a while, and then drie it, and see whether it will sprout.

Malt in the *Drenching* will swell; And that in such a manner, as after the Putting forth in *Sprouts*, and the drying upon the *Keele*, there will be gained at least a *Bushell* in eight, and yet the *Sprouts* are rubbed off; And there will be a *Bushell* of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawn from the *Water*, in which it was steeped.

Malt gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things* *Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leave their *Husk* or *Rinde* about the *Root*; But the *Onion* will carry it up, that it will be like a *Cap* upon the *Top* of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to break, as we see by the *Pilling* of *Onions*, what a holding *Substance* the *Skin* is.

Plants, that have *Curled Leaves*, doe all abound with *Moysture*; Which commeth so fast on, as they cannot spread themselves *Plain*, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the *Sides*; As in *Lettuce*, and *Young Cabbage*: And the Third is folding into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot up much; For in their *Body*, their desire of *Approach* to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid *Recesse* from the *Sunne*, maketh them spread the more. And we see it commeth to passe in some *Trees*, which have beene planted too deepe in the *Ground*, that for love of *Approach* to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also, that the *Olive* is full of *Oylie Juyce*; And *Ash* maketh the best *Fire*; And

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Cypresse is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that have the same difference; As the *Herbe* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholesome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*: And some of the *Ancients* doe report, that there was a goodly *Firre*, (which they desired to remove whole) that had a *Root* under *Ground* eight Cubits deepe; And so the *Root* came up broken.

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It hath beene observed, that a *Branch* of a *Tree*, being *Unbarked* some space at the *Bottom*, and so set into the *Ground*, hath growen; even of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above *Ground*, will die. The *Cause* may be, for that the *Unbarkt Part* draweth the *Nourishment* best, but the *Barke* continueth it onely.

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Grapes will continue *Fresh*, and *Moist*, all *Winter* long, if you hang them, *Cluster* by *Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stocke*.

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The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these *Properties*; That it is *Hollow*; That it is *Knuckled*, both *Stalke*, and *Root*; that being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalks* out of one *Root*. It differeth much in greatnesse; The smallest being fit for *Thatching* of *Houses*; And *Stopping* the *Chinkes* of *Ships*; Better than *Glew*, or *Pitch*. The Second Bignesse, is used for *Angle-Rods*, and *Staves*; And in *China* for beating of *Offenders* upon the *Thighs*. The differing *Kinds* of them are; The *Common Reed*; The *Cassia Fistula*; And the *Sugar-Reed*. Of all *Plants* it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most *Nourishment* from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

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The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Cleare*, As that of *Vines*; of *Beeches*; of *Peares*. Some *Thick*; As *Apples*. Some *Gummy*; As *Cherries*. Some *Froathy*; As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* onely; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which have the *Moistest Juices* in their *Fruit*, have commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Peares* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the *Quality* of the *Rennet*, to gather *Cheese*: And so have certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

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The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*; And it is a good *Triall*, to trie it by *Speaking* at one *End*, and *Laying* the *Eare* at the *Other*: For if it be *Knottie*, the *Voice* will not passe well. Some have the *Veines* more varied and chamloted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre* and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides there be a *Number* of *Differences* that concerne their *Use*; As *Oake*, *Cedar*, and *Chestnut*, are the

the best Builders : Some are best for *Plough-Timber* ; As *Ash* ; Some for *Peeres*, that are sometimes wet, and sometimes drie ; As *Elme* : Some for *Planchers* ; As *Deale* : Some for *Tables, Cupboards, and Deskes* ; As *Walnuts* : Some for *Ship-Timber* ; As *Oakes* that grow in *Moist Grounds* ; For that maketh the *Timber* Tough, and not apt to rift with *Ordinance* ; Wherein *English* and *Irish Timber* are thought to excell : Some for *Masts of Ships* ; As *Firre* and *Pine*, because of their Length, Straightnesse, and Lightnesse : Some for *Pale* ; As *Oake* : Some for *Fuell* ; As *Ash* : And so of the rest.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casual* : For many have been translated, and have prospered well ; As *Damaske-Roses*, that have not been knowne in *England* above an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerly *Natural* ; As the *Firre* and *Pine* love the *Mountaines* ; The *Poplar, Willow, Sallow, and Alder*, love *Rivers*, and *Moist Places* : The *Ash* loveth *Coppices* ; But is best in *Standards* alone : *Juniper* loveth *Chalke* ; And so doe most *Fruit-Trees* : *Sampire* groweth but upon *Rockes* : *Reeds* and *Osfers* grow where they are washed with *Water* : The *Vine* loveth *Sides of Hills*, turning upon the *South-East-Sunne*, &c.

The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is : As *Wilde Thyme* sheweth good *Feeding Ground* for *Cattell* : *Bettony* and *Strawberries* sheweth *Grounds* fit for *Wood* : *Camomill* sheweth *Mellow Grounds* fit for *Wheat*. *Mustard-Seed*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat* : *Burnet* sheweth good *Meadow* : And the like.

There are found, in divers *Countries*, some other *Plants*, that grow out of *Trees*, and *Plants*, besides *Mistletoe* : As in *Syria*, there is an *Herb* called *Cassyta*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth ; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, upon the *Wilde Olive*. And an *Herb* called *Hippophastron* upon the *Fullers Thorne* ; Which, they say, is good for the *Falling-Sicknesse*.

It hath been observed, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit* ; yet nevertheless *South-Winds* are also found to doe Hurt ; Especially in the *Blossoming* time ; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath been observed also, that *Green* and *Open Winters* doe hurt *Trees* ; Inasmuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will die. The *Cause* is the same with the former, because the *Lust* of the *Earth* overspendeth it selfe ; Howsoever some other of the *Ancients* have commended *Warne Winters*.

Snowes, lying long, cause a *Fruitfull Yeare* ; For first, they keepe in the *Strength* of the *Earth* ; Secondly, they water the *Earth*, better than *Raine* ; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teat*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture* ; For it is the *Froth* of the *Cloudy Waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits* ; As *Vines, Olives, Pomegranates* ; Yet it is rather for *Plenty*, than for *Goodnesse* ; For the best *Wines* are in the *Driest Vintages* : *Small Showers* are likewise good for *Corne*, so as *Parching Heats* come not upon them. Generally, *Night-Showers* are better than *Day-*

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Showers; For that the *Sunne* followeth not so fast upon them: and we see, even in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Evening*.

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The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently enquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will be very *Drie*, and *Hard* before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may be called *Mouldie*, is not good. The *Earth*, that smelleth well upon the *Digging*, or *Ploughing*, is commended; As containing the *Juyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well be; For that the *Earth* is most *Rosside*: And therefore it is commended for a *Signe* of good *Earth*. The *Poornesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sunne*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, between the two *Extremes* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Juyce*.

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It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; and of *Vines*, by name: In so much as they cast *Dust* upon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

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It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalkes*, and *Leaves* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *Land*, doth much *Good*. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Winde* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirsty, and open, to receive the *Dung*.

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The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And would be more worthy to be enquired, if it were in *Mens Power* to helpe them; Whereas many of them are not to be remedied. The *Mill-Dew* is one of the *Greatest*; which (out of question) commeth by *Clofenesse* of *Aire*; And therefore in *Hils*, or large *Champaigne Grounds*, it seldome commeth; Such as is with us *York's Woald*. This cannot be remedied, otherwise than that in *Countries* of small *Enclosure*, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oates*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the

the *Weaknesse* of the *Graine* that is sown ; For if it bee either too Old , or Mouldy, it will bring forth *Wilde Oates*. Another *Disease* is the *Society* of the *Ground* ; For if you sow one *Ground* still with the same *Corne*, (I mean not the same *Corne* that grew upon the same *Ground*,) but the same *Kinde* of *Graine* ; (As *Wheat*, *Barley*, &c.) it will prosper but poorly : Therefore besides the *Resting* of the *Ground*, you must vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times ; At the *Flouring*, by *Shaking* off the *Flowers* ; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spindling* of the *Corne* ; Which with us is rare ; But in *Hotter Countries*, common : Infomuch as the Word, *Calamitas*, was first derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-Wet* at *Sowing-Time* ; which with us breedeth much *Dearth* ; Infomuch as the *Corne* never commeth up ; And (many times) they are forced to resow *Summer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow* ; Especially in the Beginning of the *Winter*, after the *Seed* is new Sown. Another *Disease* is *Wormes* ; which sometimes breed in the *Root*, and happen upon *Hot Sunnes*, and *Showres*, immediately after the *Sowing* ; And another *Worme* breedeth in the *Eare* it Selfe ; Especially when *Hot Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds* ; And they are such, as either *Choak*, and *Over-shadow* the *Corne*, and beare it down ; Or starve the *Corne*, and deceive it of *Nourishment*. Another *Disease* is, *Over-Ranknesse* of the *Corne* ; Which they use to remedy, by *Mowing* it after it is come up ; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, near, or in *Harvest*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat* ; For those *Substances* have an *Antipathy* with *Nourishment* of *Water*.

The *Remedies* of the *Diseases* of *Corne* have been observed as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preservative*. The *Mingling* of *Seed-Corne* with *Ashes*, is thought to be good. The *Sowing* at the *Wane* of the *Moon*, is thought to make the *Corne* sound : It hath not beene practised, but it is thought to be of use, to make some *Missellane* in *Corne* ; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene observed, that the *Sowing* of *Corne* with *Houf-lecke*, doth good. Though *Graine*, that toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to *Putrifie*, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and having more of the *Huske*.

It hath been noted, that *Seed* of a yeare old, is the Best ; And of two or three yeares is worse ; And that which is more Old, is quite Barren ; Though (no doubt) some *Seed* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best : And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

It hath been observed, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth* ; Infomuch as it hath been knowne to goe three Cubits deep ; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold*, and *Acide Herb*, that (as it seemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

It hath beene observed, that some *Herbs* like best, being watred with *Salt-Water* ; And *Radish*, *Beet*, *Rew*, *Pennyroyall* ; This *Trial* would be extended

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673

to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674

It is strange, that is generally received, how some *Poysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other *Coverture*, that they take liking in, than the *Vertue* of the *Herb*.

675

It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discern, what *Corn*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the *Yeare*: For as for those, that are like to be in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleev'd to make a *Fruitfull Year* of *Corn*: An *Early Winter*, or a very *Late Winter*, a *Barren Year* of *Corn*: An *Open* and *Serene Winter*, an ill *Yeare* of *Fruit*: These we have partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676

There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oyle* Part, onely on the *Outside*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines* *Kernels*. The *Pomgranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in several *Cels*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belonging to the *Stalk*, another to the *Fruit* or *Seed*, but the *Artichoake*: No *Flower* hath that kind of Spread that the *Woodbine* hath. This may be a large Field of *Contemplation*; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: for so it is likewise in *Beasts*: *Dogs* have a resemblance with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Bufles*; *Hares* with *Ganeyes*; &c. And so in *Birds*: *Kites* and *Kestrels* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants* and *Swine* amongst *Beasts*; And the *Bird of Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have Affinity with them.

We leave the *Description* of *Plants*, and their *Vertues*, to *Herbals*, and other like *Bookes* of *Naturall History*: Wherein Mens Diligence hath been great, even to *Curiositie*: For our *Experiments* are onely such, as doe ever ascend a Degree to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, we are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

IT hath been observed, by some of the *Ancients*, that *Skins*, (especially of *Rams* newly pulled off, and applyed to the *Wounds* of *Stripes*, do keep them from Swelling, and Exulcerating; And likewise Heal them, and Close them up; And that the *Whites* of *Eggs* doe the same. The Cause is, a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and do bridle the *Deflux* of *Humours* to the Hurts, without Penning them in too much.

Experiment
Solitary touching
Healing
of Wounds.

677

YOU may turn (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Peece*s, and put the *Peece*s into a *Glas*se covered with *Parchment*; And so let the *Glas*se stand six or seven Hours in *Boyl*ing Water. It may bee an *Experiment* of Profit, for making of *Fat* or *Grease*, for many uses, But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Bears*, *Foxes*, *Padgers*, &c.

Experiment
Solitary touching
Fat dissolved
in Flesh.

678

IT is reported by one of the *Ancients*, that *New Wine*, put into *Vessels* well stopped, and the *Vessels* let down into the *Sea*, will accelerate very much, The Making of them Ripe, and Potable. The same would be tried in *Wort*.

Experiment
Solitary, touching
Ripening
of Drinke before
the Time.

679

BEASTS are more *Hairie* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Pilositie* of *Beasts*. The Cause of the Smoothness in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilositie*; But there is requisite to *Pilositie*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoever assimilath goeth not into the *Hair*;) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and excern more than *Beasts*: for their *Excrements* are ever liquid, and their *Flesh*, (generally more drie: Beside, they have not *Instruments* for *Urine*, And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and secerneth more subtilly. Again, the *Head* of *Man* hath *Hair* upon the *first Birth*, which no other *Part* of the *Body* hath. The Cause may be *Want* of *Perspiration*: For Much of the Matter of *Hair*, in the other *Parts* of the *Body*, goeth forth by *Insensible Perspiration*; And besides, the *Skull* being of a more solid Substance, nourisheth and assimilath lesse, and excerneth more: And so likewise doth the *Chin*; We see also that *Hair* commeth not upon the *Palms* of the *Hands*, nor *Soles* of the *Feet*; Which are *Parts* more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary, touching
Pilositie
and Plumage.

680

BIRDS are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The Cause is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulk of their *Body*, than in *Beasts*: For as for the Reason that some give, that they are partly Carried, whereas *Beasts* go, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kind of *Carriage* also, is not without Labour of the *Wing*.

Experiment
Solitary touching
the Quickness
of Motion in
Birds.

681

THE *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The Cause is, for that *Salt-Water* hath a little *Oyliness* in the *Surface* thereof; As appeareth in very Hot *Dayes*: And again, for that the *Southern*

Experiment
Solitary touching
the different
Clearness
of the Sea.

682

Southern Wind relaxeth the *Water* somewhat ; As no *Water Boyling* is so clear as *Cold Water*.

Experiment
Solitary touch-
ing the
different
Heats of Fire
and Boyling
Water.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Black* and *Brittle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The *Cause* is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or *Attenuation* causeth the *Light*; And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therefore we see that, *Hot Water* will quench *Fire*. And again we see that in *Bodies* wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Eggs Boyled* and *Roasted*, (into which the *Water* entreth not at all, there is scarce difference to be discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

Experiment
Solitary touch-
ing the
Qualification
of Heat by
Moisture.

684

The *Bottome* of a *Vessel* of *Boyling Water*, (as hath been observed,) is not very much *Heated*, So as men may put their hand under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth *Coals*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moisture*, although it doth not pass thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the *Body*, but by Qualifying of the *Heat*, and *Cold*: As we see in this *Instance*: And wee see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*) differeth not much from the *Water* of *Things distilled* by *Fire*: We see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will; Nay we see more, that *Butter*, or *Oile*, which in themselves are *Inflammable*, yet by the *Vertue* of their *Moisture*, will doe the like.

Experiment
Solitary touch-
ing Yawn-
ing.

685

IT hath been noted by the *Ancients*, that it is dangerous to Pick ones *Ear*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the *Inner Parchment* of the *Ear* is extended, by the *Drawing* in of the *Spirit* and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawn in, and then strongly Expelled.

Experiment
Solitary touch-
ing the
Hiccough.

686

IT hath been observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *lifting up* of the *Stomack*; which *Sneezing* doth somewhat depresse, and divert the *Motion* another way. For first we see, that the *Hiccough* cometh of *Fulness* of *Meat*, (especially in *Children*;) which causeth an *Extension* of the *Stomack*: Wee see also, it is caused by *Acide Meats*, or *Drinks*, which is by the *Pricking* of the *Stomack*: And this *Motion* is ceased either by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth help somewhat to cease the *Hiccough*: And putting a man into an *Earnest Studie* doth the like: As is commonly used: And *Vinegar* put to the *Nostrils*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirit*.

Experiment
Solitary touch-
ing Sneez-
ing.

687

Looking against the *Sun*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nostrils*; For then the holding up of the *Nostrils* against the

the *Sunne*, though one *Winke*, would doe it; But the *Drawing* downe of the *Moisture* of the *Brain*: For it will make the *Eyes* runne with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrils*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrils* within, doth draw the *Moisture* to the *Nosthrils*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the *Rubbing* of the *Eyes*, till they runne with *Water*, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrils*, is diverted to the *Eyes*.

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double, The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth*, are *Parts* without *Blood*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinewes* are much affected with *Cold*; For that they are *Parts* without *Blood*: So the *Bones* in Sharpe *Colds* waxe *Brittle*: And therefore it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment
Solitary touching the
Tenderneſſe of
the Teeth.
688

IT hath been noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tenderneſſe* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment
Solitary touching the
Tongue.
689

VWhen the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefly *Bitter*; And sometimes *Loathſome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathſome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment
Solitary touching the
Taste.
690

IT was observed in the *Great Plague* of the last Yeare, that thete were seene, in divers *Ditches*, and low grounds, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great *Disposition* to *Putrefaction* in the *Soile* and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parſnips*,) are more *Sweet*, and *Lushious*, in *Infectious* Yeares, than in other Yeares.

Experiment
Solitary, touching some
Prognosticks
of Pestilentiall
Seasons.
691

VWise *Phisicians* should with all diligence inquire, what *Simples* Nature yeeldeth, that have extreame *Subtile Parts*, without any *Mordication*, or *Acrimony*: For they undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this Kinde is the *Dwarfe-Pine*; which is Proper for the *Faundies*: Of this Kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this Kinde is *Piony*; which is Proper for *Stop-pings* in the *Head*: Of this Kinde is *Fumitory*, which is Proper for the *Spleen*: And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathſome to take, are of this kinde; As *Earth-Wormes*, *Timber-Sowes*, *Snailles*, &c. And I conceive, that the *Trochicks* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited,

Experiment
Solitary, touching Speciall
Simples for
Medicines.
692

condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts of Beasts Putrefied*; (as *Castoreum*, and *Musk*, which have extream *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefaction of Plants*, (as *Agaricke*, and *Fewes-Eare*,) are of greatest Vertue. The Cause is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts of Bodies*: And since we cannot take down the *Lives of Living Creatures*, (which some of the *Paracelsians* say (if they could be taken down,) would make us *Immortall*;) the Next is for *Subtily of Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments
in Confort,
touching
Venus.

693

IT hath been observed by the *Ancients*, that *Much Use of Venus* doth *Dim* the *Sight*; And yet *Eunuches*, which are unable to generate, are (nevertheless) also *Dimme-Sighted*. The Cause of *Dimnesse of Sight*, in the Former, is the *Expence of Spirits*: In the Latter, the *Over-moisture* of the *Braine*. For the *Over-Moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrereth as another Cause: we see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c.

694

The *Pleasure* in the *Act of Venus*, is the greatest of the *Pleasures* of the *Senses*; The Matching of it with *Itch* is improper; though that also be *Pleasing* to the touch. But the Causes are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many *Severall Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the *Parts* for *Generation*. Therefore *Scaliger* doth well, to make the *Pleasure of Generation* a *Sixth Sense*; And if there were any other differing *Organs* and *Qualified Perforations*, for the *Spirits* to pass; there would be more than the *Five Senses*: Neither doe we well know, whether some *Beasts* and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* immediately, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smels*; And *Wine*, and the like *Sweet Vapours*. For *Smels*, we see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certaine, that the *Pleasure of Drunkenesse*, is next the *Pleasure of Venus*: And *Great Foyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure of Venus* is somewhat of the same Kinde.

695

It hath been always observed, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The Cause is, for that the *Spirits*, in a *Body* more Hot and Drie, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*; and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the use of *Venus*, in *Moist* and well-habituated *Bodies*, breedeth a *Number of Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a *Principall Evacuation*, especially of the *Spirits*: For of the *spirits*, there is scarce any *Evacuation*, but

but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things* is commonly better perceived, in *Smal*, than in *Great*; and in *unperfect*, than in *Perfect*; and in *Parts*, than in *whole*: So the *Nature* of *Vivification* is best inquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Vivification*. Secondly, in *Disclosing* the *Originall* of *Figuration*. Thirdly, in *Disclosing* many things in the *Nature* of *Perfect Creatures*, which in them lie more hidden. And Fourthly, in *Traducing* by way of *Operation*, some *Observations* in the *Insecta*, to work *Effects* upon *Perfect Creatures*. Note that the word *Insecta* agreeth not with the *Matter*, but we ever use it for *Brevities* sake, intending by it *Creatures* bred of *Putrefaction*.

Experiments
in Consort,
touching the
Insecta.

The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud* or *Dung*; As the *Earth-worms*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth *Putrifie*, as not able to *Preserve* it self: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions* of *Nourishment*. Some breed in *Wood*, both *Growing*, and *Cut down*. *Quare* in what *Woods* most, and at what *Seasons*? We see that the *Worms* with many *Feet*, which round themselves into *Balls*, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are said to bee found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Coverture*, both from *Sun*, and *Rain* or *Dew*; As the *Timber* is; And therefore they are not *Venemous*, but (contrariwise) are held by the *Physitians* to *clarifie* the *Bloud*. It is observed also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Hair* of *Living Creatures*; As *Lice*, and *Tikes*, which are bred by the *Sweat* close kept, and somewhat *airefied* by the *Hair*. The *Excrements* of *Living Creatures* doe not onely breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *Wormes* whereto *Children* are most subject, and are chiefly in the *Guts*. And it hath been lately observed by *Physicians*, that in many *Pestilent Diseases*, there are *Worms* found in the upper *Parts* of the *Body*, where *Excrements* are not, but only *Humours* *Putrified*. *Fleas* breed principally of *Straw* or *Mats*, where there hath been a little *Moisture*; Or the *Chamber* and *Bed-straw*, kept close, and not *Aired*. It is received that they are killed by strewing *Worm-wood* in the *Rooms*. And it is truly observed, that *Bitter Things* are apt, rather to kill, then engender *Putrefaction*; And they be *Things* that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worm*, that breedeth in *Meal*, of the shape of a large white *Maggot*, which is given as a great dainty to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*: Especially if they be laid up dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worm* called a *Wcwill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing Waters*; As the *Water-Spider*, that hath six *Legs*. The *Flie* called the *Gad-flie*, breedeth of somewhat that *Swimmeth* upon the *Top* of the *Water*, and is most about *Ponds*. There is a *Worm* that breedeth of the *Dregs* of

of *Wine Decayed*, which afterwards, (as is observed by some of the *Ancients*) turneth into a *Gnat*. It hath been observed by the *Ancients*, that there is a *Worm* that breedeth in old *Snow*, and is of Colour Reddish, and dull of Motion, and dyeth soon after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*; For else it could hardly Vivifie. And the Reason of the Dying of the *Worm*, may be the sudden Exhaling of that little *Spirit*, as soon as it cometh out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were preserved in *Cold*. It is affirmed, both by the *Ancient* and *Modern Observation*, that in *Furnaces* of *Copper* and *Brass*, where *Chalcites*, (which is *Vitriol*), is often cast in, to mend the working, there riseth suddenly a *Flie*, which sometimes moveth, as if it took hold on the walls of the *Furnace*; Sometimes is seen moving in the *Fire* below; And dieth presently, as soon as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well *Violent Heat* of *Fire*, as the *Gentle Heat* of *Living Creatures*, wil Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; Matter *Viscous* or *Tenacious*, to hold in the *Spirit*; And that Matter to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soon as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will put forth and germinate, as we see in *Chymicall Trials*. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But we will not take upon us now to Enumerate them all.

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The *Insecta* have been noted by the *Ancients* to feed little: But this hath not been diligently observed; For *Grashoppers* eat up the *Green* of whole *Countries*; And *Silk-Worms* devour *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that sleep and rest much, Eat little, As *Dormice* and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *juyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integral Parts* have Extreme Variety, but the *Similar Parts* little. It is true, that they have, (some of them,) *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of long *Life*: Yet *Bees* have been known to live seven years: And *Snakes* are thought the rather for the *Casting* of their *Spoil*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow very long: And those that Enterchange from *Worms* to *Flies* in the *Summer*, and from *Flies* to *Wormes* in the *Winter*, have been kept in Boxes four yeers at the least. Yet there are certain *Flies* that are called *Ephemera*, that live but a day. The *Cause* is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sun*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*), revive easily, when they seem dead, being brought to the *Sun*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the easie dilating of it by a little *Heat*. They stir a good while after their *Heads* are off, or that they be cut in *Peeces*; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

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The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* go right forwards

forwards to their Hills ; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their Hives. It may be, *Gnats*, and *Flies*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling* ; which is manifestly untrue ; For if they goe forth right to a Place, they must needs have Sight : Besides, they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste* : And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing* : Which sheweth likewise that though their *Spirits* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations concerning the Insecta, together with the Enumeration of them, we referre to that place, where we meane to handle the Title of Animal's in generall.

A Man Leppeth better with *Weights*, in his *Hands*, than without. The Cause is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinewes*, by *Contracting* them. For otherwise, where no *Contraction* is needful, *Weight* hindreth. As we see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force : For the *Hands* goe backward before they take their Raise. *Quare*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were to breake forth with more Force : As *Breath* also drawne, and kept in, cometh forth more forcibly : And in *Casting* of any *Thing*, the *Armes*, to make a greater *Swing*, are first cast backward.

Experiment
Solitary touching
Leaping.
696

OF *Musical Tones*, and *Unequall Sounds*, we have spoken before ; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened ; *Grinding* of one *Stone* against another ; *Squeaking*, or *Skriching Noise* ; make a *Shivering* or *Horror* in the *Body*, and set the *Teeth* on edge. The Cause is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure* : There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull* ; But the same *Things Painted* do little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally affect most : This is most manifest in *Musicke* ; and *Concords* and *Discords* in *Musicke* : For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a *Roundnesse* and *Equallity* ; And if they be Harsh, are *Unequall* : For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequality*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse* ; As in the *Purling* of a *Wreathed String* ; And in the *Raucity* of a *Trumpet* ; And in the *Nightingale-Pipe* of a *Regall* ; And in a *Discord* straight falling upon a *Concord* : But if you stay upon it, it is *Offensive* ; And therefore, there be these three *Degrees* of *Pleasing*, and *Displeasing* in *Sounds* ; *Sweet Sounds* ; *Discords* ; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we plainly see what an Intercourse there is, between the *Teeth*, and the *Organ* of the *Hearing* ; by the *Taking* of the End of a *Bow*, between the *Teeth*, and *Striking* upon the *String*.

Experiment
Solitary, touching the
Pleasures, and
Displeasures of
the Senses, especially of
Hearing.
700

10-10-68
10-10-68
10-10-68
10-10-68
10-10-68
10-10-68
10-10-68



NATURAL HISTORY.

VIII. Century.



Here be *Minerals*, and *Fossiles*, in great Variety; but of *Veines of Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Arminus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing of Wonnds*, *Stanching of Bloud*, *Stopping of Fluxes and Rheumes*, and *Arresting the Spreading of Poyson, Infection, and Putrefaction*: And they have of all other *Simples*, the *Perfectedst and Purest*

Experiment
Solitary, tou-
ching *Veines*
of *Medicinall*
Earth.

701

Quality of Drying, with little or no Mixture of any other *Quality*. Yet it is true, that the *Bolus Arminus* is the most *Cold* of them; And that *Terra-Lemnia* is the most *Hot*; For which cause the *Island Lemnos*, where it is digged; was in the Old *Fabulous Ages* consecrated to *Vulcan*.

A Bout the *Bottomes* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rockes*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there be but few *Substances, Plant-like*, that grow deep within the *Sea*; For they are gathered sometimes fifteen *Fathome* deepe; And when they are laid on *Shoare*, they seeme to be of great *Bulkè*; But crushed together, will be transported in a very small *Roome*.

Experiment
Solitary tou-
ching the
Growth of
Sponges.

702

I T seemeth that *Fish*, that are used to the *Salt-Water*, doe neverthelesse de-
light more in *Fresh*. We see, that *Salmons*, and *Smelts* love to get into *Ri-
vers*, though it be against the *Stream*. At the *Haven of Constantinople*, you shal
have great Quantities of *Fish* that come from the *Euxine-Sea*; that when they
come into the *Fresh-Water*, doe inebriate and turne up their *Bellies*; So as you
may take them with your Hand. I doubt, there hath not been sufficient Ex-

Experiment
Solitary tou-
ching *Sea-
Fish* put in
Fresh Waters.

703

periment made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may bee, the *Fish* will eat the pleasanter, and may fall to breed: And it is said, that *Colchester Oysters*, which are put into Pits, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment
Solitary, touch-
ing Attraction by Simi-
litude of Sub-
stance.

704

THE *Turkish-Bow* giveth a very Forcible Shoot; Insomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, save *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude of Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion of Gravity*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-Stone*. But this same *Motion of Weight or Gravity*, (which is a meere *Motion of the Matter*, and hath no *Affinity* with the *Form*, or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; And in these *Instances of Arrows*; For then the *Motion of Attraction by Similitude of Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment
Solitary, touch-
ing certaine
Drinks in Tur-
key.

705

THEY have in *Turkey*, and the *East*, certaine *Confections*, which they call *Servets*, which are like to *Candied Conserves*, And are made of *Sugar* and *Lemons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other *Flowers*; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marveil, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing* in *Constantinople*; Considering they have such Quantity of *Barley*. For as for the generall Sort of *Men*, Frugality may be the Cause of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their *Healths*, and their *Complexions*. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments
in Consort,
touching
Sweat.

706

IN *Bathing* in *Hot Water*, *Sweat* (neverthelesse) commeth not in the *Parts* under the *Water*. The Cause is; First, for that *Sweat* is a *Kinde of Colliquation*. And that *Kinde of Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As we see that even *Hot Water* quencheth *Fire*: And *Over-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sunne*, or *Fire*, than if they stood naked; And *Earthen Bottles*, filled with *Hot Water*, doe provoke, in Bed, a *Sweat* more daintily, than *Brick-Bats* Hot. Secondly. *Hot Water* doth cause *Evapouration* from the *Skin*; So as it spendeth the *Matter*, in those *Parts* under the *Water*, before it issueth in *Sweat*.

Sweat. Againe, *Sweat* commeth more plentifully, if the *Heat* bee increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorifick Herbs*, in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the lesse *Heated* first, and after halfe an Hour the more *Heated*.

Sweat is *Salt* in Taste; the *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud* and *Flesh*; And the *Sweat* is only that *Part*, which is *Separate*, and *Excerned*. *Bloud* also *Raw*, hath some *Salt-nesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Upper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Drie*; As the *Forehead*, and *Breast*.

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleep* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat*, and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becometh more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neare *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation*, or *Forsaking* of the *Spirits*, whereby the *Moisture* of the *Body*, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

In those *Diseases* which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them *Oppressed*; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much we see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is very fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the *Fineness*, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Flie* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Flie* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not scene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, give as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so far as to be *Winged*.

THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Fear* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* upright;

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710

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Experiment
Solitary, touching the
Glo-worme.

712

Experiments
in Consort, touching the
Impressions, which the
Passions of the
Minde make upon the *Body*.

713

right; Starting; and Scritchng. The *Palenesse* is caused, for that the *Bloud* runneth inward to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing upright* of the *Haire* is caused, for that by *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Scritchng* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they bee unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* upon *Paine*.

714

Griefe, and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty. *Sobbing* is the same *Thing* stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath been said: For when the *Spirits* cannot expell the *Thing* that hurteth, in their *Strife* to doe it, by *Motion* of *Consent*, they expell the *Voyce*. And this is, when the *Spirits* yeeld, and give over to resist; For if one doe constantly resist *Paine*, he will not groane. *Teares* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*: For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell; Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

715

Foy causeth a *Cheerfulness* and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the effects of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath been seen, that *Excessive sudden Foy* hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Teares*, they are the Effects of *Compression* of the *Moisture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath been said in *Griefe*. But then in *Foy*, it worketh it diversly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupie more *Roome*.

716

Anger causeth *Palenesse* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Palenesse*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves, call in more *Spirits* from the *Outward Parts*. And if the *Palenesse* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with some *Feare*, but in many there is no *Palenesse* at all, but contrariwise *Rednesse* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits*

Spirits in an *Appetite to Revenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming at the Mouth* is from the same *Cause*, being an *Ebullition*; *Stamping*, and *Bending of the Fist*, are caused by an *Imagination* of the *Act of Revenge*.

Light Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and *Definite Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which we use, when we refuse a *Thing*, or warne it away. The *Frowning* and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some *Measure*. And we see also, this *Knitting* of the *Browes* will follow upon earnest *Studying*, or *Cogitation* of any *Thing*, though it be without *Dislike*.

Shame causeth *Blushing*; And *Casting Downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame*, is the *Part* that laboureth most. And although the *Blushing* will be seen in the whole *Breast*, if it be *Naked*, yet that is but in *Passage* to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reverence* a *Man* beareth to other *Men*; Whereby, when he is ashamed, he cannot endure to looke firmly upon Others: And we see, that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when we come before *Many*; *Ore Pompeii quid mollius? Nunquam non coram pluribus erubuit*: And likewise when we come before *Great*, or *Reverend Persons*.

Pitty causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pitty* is but *Griefe* in Anothers *Behalfe*. The *Cast* of the *Eye* is a *Gesture* of *Aversion*, or *Lothnesse* to behold the *Object* of *Pitty*.

Wonder causeth *Astonishment*, or an *Immoveable Posture* of the *Body*; *Casting up* of the *Eyes* to *Heaven*; And *Lifting up* of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not spaiate and transcurr, as it useth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to move. As for the *Casting up* of the *Eyes*, and *Lifting up* of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*.

Laughing causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be *Violent*, and *Continued*. Wherein first it is to be understood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is *Proper* to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinity* with the *Passions* of the *Minde*,) it is moved, and that in great vehemency, onely by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieved State* of *Minde*, yet cannot sometimes forbear *Laughing*. Thirdly, it is ever joyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Foy*, though it be a much *Lighter Motion*: *Res severa est verum Gaudium*.

717

718

719

720

721

dium. Fourthly, that the *Object* of it is *Deformity*, *Absurdity*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these *Generall Notes* give some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voyce*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath been formerly touched, where we spake of the *Teares* of *Foy* and *Griefe*,) is an *Effect* of *Dilatation* of the *Spirits*. And for *Suddenesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrewd Turne* that lighteth upon Another; Or any *Deformity*, &c. moveth *Laughter* in the *Instant*; Which after a little time it doth not. So we cannot *Laugh* at any thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard*, or *Continued Touch*, it doth not move *Laughter* so much.

722

Lust causeth a *Flagrancy* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the *Things* desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (for that great Use may be made of the *Observation*,) that (evermore) the *Spirits* in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venerous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

Experiments
in Confort,
touching
Drunkennesse.

723

It hath been observed by the *Ancients*, and is yet beleev'd, that the *Sperme* of *Drunken Men* is *Unfruitfull*. The *Cause* is, for that it is *Over-moistened*, and wanteth *Spissitude*. And wee have a merry Saying, that they that goe *Drunke to Bed*, get *Daughters*.

724

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They *Reele*; They *tremble*; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate *Part* of the *Place*, where they are; And so make them *Weake* to move. And therefore *Drunken Men* are apt to fall asleep: And *Opiates*, and *Stupefactive*s, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossnesse* of their *Vapour*; as *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse *Supple*, and *Apt* to move.

725

Drunken Men imagine every *Thing* turneth round; They imagine also that *Things* come upon them; They *See* not well *Things* as farre off; Those *Things* that they *See* neare hand, they *See* out of their place; And (sometimes) they *see Things double*. The *Cause* of the *Imagination* that *Things* turne Round, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And we see that long *Turning Round* breedeth the same *Imagination*. The *Cause* of the *Imagination* that *Things* come upon them, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on; And besides, when they see *Things* turne Round, and Move, *Feare* maketh them thinke they come upon them. The *Cause* that they cannot see *Things* as farre off, is the *Weaknesse* of the *Spirits*; for in every *Megrin*, or *Vertigo*, there is an *Obtenebration* joyned with a Semblance of *Turning Round*; Which we see also in the lighter Sort of *Swonings*.

nings. The Cause of Seeing things out of their Place, is the Refraction of the Spirits Visuall; For the Vapour is as an Unequall Medium; And it is; as the Sight of Things, out of place, in Water. The Cause of Seeing Things double, is, the Swift and Unquiet Motion of the Spirits, (being Oppressed,) to and fro; For, (as was said before,) the Motion of the Spirits Visuall, and the Motion of the Object, make the same Appearances; And for the Swift Motion of the Object, we see, that if you fillip a Lute-String, it sheweth double, or Treble.

Men are sooner Drunke with Small Draughts, than with Great. And againe, Wine Sugred inebriateth lesse, than Wine Pure. The Cause of the Former is, for that the Wine descendeth not so fast to the Bottome of the Stomach; But maketh longer Stay in the Upper Part of the Stomach, and sendeth Vapours faster to the Head; And therefore inebriateth sooner. And, for the same Reason, Sops in Wine, (Quantity for Quantity,) inebriate more, than Wine of it selfe. The Cause of the Latter is, for that the Sugar doth inspissate the Spirits of the Wine, and maketh them not so easie to resolve into Vapour. Nay further, it is thought, to be some Remedy against Inebriating, if Wine Sugred be taken after Wine Pure. And the same Effect is wrought either by Oyle, or Milke, taken upon much Drinking.

726

THe Use of Wine, in Drie, and Consumed Bodies, is hurtfull; In Moist, and Full Bodies, it is good. The Cause is, for that the Spirits of the Wine doe prey upon the Dew, or Radicall Moisture, (as they terme it,) of the Body, and so deceive the Animall Spirits. But where there is Moisture Enough, or Superfluous, there Wine helpeth to digest, and desiccate the Moisture.

Experiment
Solitary touch-
ing the
Help or Hurt
of Wine,
though Mode-
rately used.

727

Experiment
Solitary touch-
ing Catter-
pillers.

728

THe Catterpillar is one of the most Generall of Wormes, and breedeth of Dew, and Leaves; For we see infinite Number of Catterpillers, which breed upon Trees: and Hedges; By which the Leaves of the Trees, or Hedges, are in great Part consumed; As well by their Breeding out of the Leafe, as by their Feeding upon the Leafe. They breed in the Spring chiefly, because then there is both Dew, and Leafe. And they breed commonly when the East Winds have much blowne: The Cause whereof is, the Driness of that Wind: For to all Vivification upon Putrefaction, it is requisite the Matter be not too Moist: And therefore we see, they have Copwebs about them, which is a signe of a Slimy Driness: As we see upon the Ground, whereupon, by Dew, and Sunne, Copwebs breed all over. We see also the Greene Catterpillar breedeth in the Inward Parts of Roses, especially not blowne, where the Dew sticketh: But especially Catterpillers, both the greatest, and the most, breed upon Cabbages; which have a Fat Leafe, and apt to Putrifie. The Catterpillar toward the End of Summer waxeth Volatile, and turneth to a Butterflie, or perhaps, some other Fly. There is a Catterpillar, that hath a Furre, or Downe upon him, and seemeth to have Affinity with the Silke-worme.

THe Flies Cantharides are bred of a Worme, or Catterpillar, but peculiar to certaine Fruit-Trees; As are the Fig-Tree, the Pine-Tree, and the Wilde Briar; All which beare Sweet Fruit; And Fruit that hath a kinde of secret Biting, or Sharpnesse: For the Fig hath a Milke in it, that is Sweet, and Corrosive, The Pine-Apple hath a Kernell that is Strong and Abstersive: The Fruit of the Briar is said to make Children, or those that Eat them, Scabbed. And therefore, no marveil though Cantharides have such a Corrosive, and Cauterizing Quality; For there is not one other of the Insecta, but is bred of a Duller Matter. The Body of the Cantharides is bright coloured; And it may be,

Experiment
Solitary touch-
ing the
Flies Cantha-
rides.

729

be, that the delicate-coloured *Dragon-Flies*, may have likewise some *Corrosive Quality*.

Experiments
in Confort,
touching
Lassitude.

730

L *Assitude* is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warmed Water*. The Cause is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxion*, or *Emolition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The Reason whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going down a Hill*, the *Thighes*. The Cause is, for that in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the *Weight* of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment
Solitary tou-
ching the
Casting of the
Skin, and *Shell*
in some Crea-
tures.

732

T He *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod*, or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne by the *Extream Tendernesse* and *Softnesse* of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The Cause of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantity* of *Matter* in those *Creatures*, that is fit to make *Skin* or *Shell*; And againe, the *Loosenesse* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds* that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Confort,
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the *Making* of the *Bed*; Or with the *Legs gathered up*, which is in the *Posture* of the *Body*, is the more *Wholesome*. The Reason is, the better *Comforting* of the *Stomach*, which is by that lesse *Penfile*: And we see, that in *Weake Stomachs*, the *Laying up* of the *Legs* high, and the *Knees* almost to the *Mouth*, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their *Miserie* otherwise, are commonly *Fat* and *Fleshy*; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is *Penfile* in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing*, being *Set*.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The Cause is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, flie more up into the *Head*.

735

Leaning long upon any *Part* maketh it *Numme*, and, as we call it, *Asleepe*.
The

The Cause is, for that the *Compression* of the *Parts* suffereth not the *Spirits* to have free *Accesse*; And therefore when we come out of it, we feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

IT hath been noted, that those *Yeares* are *Pestilentiall*, and *Unwholesome*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The Cause is plaine; For that those *Creatures* being ingendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary, touching *Pestilentiall* *Yeares*.

736

IT is an *Observation* amongst *Countray People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantity* of *Cold Vapours*, not dissipate; Which causeth the *Cold* of the *Winter* following.

Experiment
Solitary, touching the *Prognosticks* of *Hard Winters*.

737

THEY have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into *Powder*, in *Water*, as *Hot* as they can *Drinke* it: And they take it, and sit at it in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Digestion*. Certainly this *Berry-Coffa*; The *Root*, and *Leafe Betell*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*) of which the *Turkes* are great *Takers*, (supposing it expelleth all *Fear*;) doe all *Condense* the *Spirits*, and make them *Strong*, and *Aleger*. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betell* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, *Root*, and *Flower*; Of *Folium Indurum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *scarlet Powder*, which they call *Kermex*; And (generally) of all such *Things*, as doe inebriate and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment
Solitary touching *Medicines* that *Condense*, and *Relieve* the *Spirits*.

738

THE *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcobole*; Which with a fine long *Pencill* they lay under their *Eye-Lids*; Which doth colour them *Blacke*, Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into *Embowed Arches*. You shall finde that *Xenophon* maketh *Mention*, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* *Blacke*: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* black, by *Combing* it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chineses*, who are of an ill *Complexion*, (being *Olivaster*;) they paint their *Cheekes* *Scarlet*; Especially their *King*, and *Grandees*. Generally, *Barbarous People*, that goe *Naked*,

Experiment
Solitary touching *Paintings* of the *Body*.

739

Naked, doe not onely paint Themselves, but they pounce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West-Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how, Or at least, they will have *Gay Skins*, in stead of *Gay Clothes*.

Experiment
Solitary touching the use
of Bathing and
Annointing.

740

IT is strange, that the use of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and the *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a Part of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because of their *Drinking Water*, and *Feeding* upon *Rize*, and other Food of small Nourishment, maketh their Bodies so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathy*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annointing*, may be so used, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary touching Chamo-
letting of Pa-
per.

741

THE *Turks* have a Pretty Art of *Chamoletting* of *Paper*, which is not with us in use. They take divers *Oyled Colours*, and put them severally (in drops) upon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some Thickness,) with it; And the *Paper* will be Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment
Solitary touching Cuttle-
Inke.

742

IT is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* should be as *Black* as *Inke*. A Man would thinke, that the Cause should be the *High Concoction* of that *Bloud*; For we see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Black*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary, touching Encrease
of Weight in
Earth.

743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*; And preserve it in that manner, that it neither come to be Wet, nor Wasted; And Weigh it daily, it will not alter *Weight* untill the seventeenth of *June*, which is the Day when the *River* beginneth to rise; And then it will grow more and more *Ponderous* till the *River* commeth to his Heighth. Which if it be true, it cannot be caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath beene observed, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth *Weight*; and after being laid in the open *Aire*, recovereth *Weight* againe. And it should seeme, that as soone as ever the *River* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that upon that very Day, when the *River* first riseth, great *Plagues*, in *Cairo*, use suddenly to breake up.

Experiments
in Consort,
touching
Sleep.

744

THose that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The Cause may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For we see, that in great *Colds*, one can scarce draw

draw his *Breath*. Another *cause* may be, for that *cold* calleth the *Spirits* to succour; and therefore they cannot so well close, and goe together in the *Head*; which is ever requisite to *Sleepe*. And for the same Cause, Paine, and Noise hinder *Sleepe*; and *Darkness* (contrariwise) furthereth *Sleep*.

Some Noises (whereof we spake in the 112. Experiment) helpe *Sleep*; as the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The Cause is, for that they move in the *Spirits* a gentle attention; and whatsoever moveth attention, without too much Labour, stilleth the *Naturall* and *disursive Motion* of the *Spirits*.

Sleep nourisheth, or at least preserveth *Bodies*, a long time, without other Nourishment. *Beasts* that *Sleep* in winter, (as it is noted of *wild Bears*;) during their *Sleep* wax very fat, though they eate nothing. *Bats* have been found in *Ovens*, and other *Hollow close Places*, Matted one upon another; and therefore it is likely that they *Sleepe* in the winter time, and eat nothing. *Quere*, whether *Bees* do not *Sleep* all winter, and spare their *Honey*? *Butterflies*, and other *Flies*, do not only *Sleep*, but lie as dead all winter; and yet with a little Heat of *Sunne*, or *Fire*, revive againe. A *Dormouse*, both *Winter* and *Summer*, will *Sleep* some dayes together, and eat Nothing.

To restore *Teeth* in *Age*, were *Magnale Natura*. It may bee thought of. But howsoever, the *Nature* of the *Teeth* deserveth to be inquired of, as well as the other *Parts* of *Living Creatures Bodies*.

There be *Five Parts* in the *Bodies* of *living Creatures*, that are of hard Substances; the *Skull*; the *Teeth*; the *Bones*; the *Horns*; and the *Nails*. The greatest *Quantity* of *Hard Substance* continued, is towards the *Head*. For there is the *Skull* of one entire *Bone*; there are the *Teeth*; there are *Maxillary Bones*; there is the *hard bone*, that is the instrument of hearing; and thence issue the horns: So that the Building of *Living Creatures Bodies*, is like the Building of a *Timber-House*, where the walls, and other parts have *Columns*, and *Beams*; But the *Roofe* is, in the better sort of Houses, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have three other hard Substances proper to them; The *Bill*, which is of the Like Matter with the *Teeth*; for no *Birds* have *Teeth*: the *Shell* of the *EGGE*: and their *Quills*: for as for their *Spurre*, it is but a *Naile*. But no *Living Creatures*, that have *Shells* very hard; (as *Oysters*, *Cocles*, *Mustles*, *Shalops*, *Crabs*, *Lobsters*, *Cra-fish*, *Shrimps*; and especially the *Tortoise*;) have *Bones* within them, but only little *Gristles*.

Bones, after full growth, continue at a stay: and so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renewed: *Teeth* stand at a stay, except their wearing: as for *Nails*, they grow continually: and *Bills* and *Beaks* will over grow, and sometimes be cast; as in *Eagles*, and *Parrots*.

Most of the *Hard Substances* flie to the *Extremes* of the *Body*; as *Skull*, *Horns*, *Teeth*, *Nails*, and *Beaks*: Onely the *Bones* are more inward, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; save that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; and it may be in some other *Creatures*.

The *Skull* hath *Brains*, as a kind of *Marrow*, within it. The *back-bone* hath one Kinde of *Marrow*, which hath an Affinity with the *braine*; and other *bones* of the *body* have another. The *law-bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have

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Experiment
in Consort,
touching
Teeth and
Hard Substances
in the *Bodies*
of *Living*
Creatures.

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have a kind of *Marrow* diffused, which cauſeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more then *Bloud*. *Horne* is alike throughout; and ſo is the *Nail*.

751 None other of the *Hard Subſtances* have *Sense*, but the *Teeth*: and the *Teeth* have *Sense*, not only of *Paine*, but of *Cold*.

But we will leave the *Enquiries* of other *Hard Subſtances*, unto their ſeverall *Places*; and now enquire only of the *Teeth*.

752 The *Teeth* are, in *Men*, of three *Kindes*: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; and *Pointed-Teeth*, or *Canine*, which are between both. But there have been ſome *Men*, that have had their *Teeth* undivided, as of one whole *Bone*, with ſome little *Marke* in the place of the *Division*; as *Pyrrhus* had. Some *Creaturs* have *Over-long*, or *Out-growing Teeth*, which we call *Fangs*, or *Tuskes*; as *Boares*, *Pike*, *Salmons*, and *Dogs*, though leſſe. Some *Living Creatures* have *Teeth* againſt *Teeth*; as *Men*, and *Horses*; and ſome have *Teeth*, eſpecially their *Maſter Teeth*, indented one within another, like *Sawes*; as *Lions*; and ſo againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Roofes* of their *Mouthes*; as *Pikes*, *Salmonds*, *Trouts*, &c. And many more in *Salt-waters*. *Snakes*, and other *Serpents* have *Venemous Teeth*; which are ſometimes miſtaken for their *Sting*.

753 No *Beaſt* that hath *Hornes*, hath *Vpper Teeth*; and no *Beaſt*, that hath *Teeth* above, wanteth them below: But yet if they be of the ſame kind, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*; it will goe into *Hornes*; Nor yet *converſo*; For *Doe's*, that have no *Horns*, have no *Vpper Teeth*.

754 *Horses* have, at three years old, a *Tooth* put forth, which they call the *Colts Tooth*; and at foure yeares old there commeth the *Marke-Tooth*, which hath a *Hole*, as big as you may lay a *Peaſe* within it; and that weareth ſhorter and ſhorter, every yeare, till that at eight years old, the *Tooth* is ſmooth, and the *hole* gone; and then they ſay; That the *Marke* is out of the *Horses Mouth*.

755 The *Teeth* of *Men* breed firſt, when the *Child* is about a yeare and halfe Old: and then they caſt them, and new come about ſeven yeares old. But divers have *Backward-Teeth* come forth at twenty, yea ſome at thirty, and forty. *Quære* of the manner of the *Comming* of them forth. They tell a tale of the old *Counteſſe* of *Deſmond*, who lived till ſhe was ſeventy ſcore yeares old, that ſhe did *Dentire* twice; or thrice; Caſting her old *Teeth*, and others *Comming* in their *Place*.

756 *Teeth* are much hurt by *Sweet-meats*; and by *Painting* with *Mercury*; and by things over-hot; and by things over-cold; and by *Rhuems*. And the *paine* of the *Teeth*, is one of the ſharpeſt of *Pains*.

757 Concerning *Teeth*, theſe things are to be *Conſidered*. 1. The *Preſerving* of them. 2. The *Keeping* of them *whie*. 3. The *Drawing* of them with *Leaſt Paine*. 4. The *Staying* and *Eaſing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have been ſtrucken out. 6. And laſt of all, that *Great One*, of *Reſtoring Teeth* in *Age*. The *inſtances* that give any *likeli-hood* of *Reſtoring Teeth* in *Age*, are; the *Late Comming* of *Teeth* in ſome; and the *Renewing* of the *Beaks* in *Birds*, which are *Commatericall* with *Teeth*. *Quære* therefore more *partieularly* how that *Commeth*. And againe, the *Renewing* of *Hornes*. But yet that hath not beene *Knowne* to have beene *provoked* by art; Therefore let *triall* be made, whether *Hornes* may be *procured* to grow in *Beaſts* that are not *Horned*, and how? And whether they

they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deer*, have a greater *Head of Hornes*? And whether the *Head* of a *Deer*, that by age is more *Spitted*, may bee brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by Art such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have something done to them when they are *Young*; whereby they may bee made to have *Greater*, or *Longer Bills*; Or *Greater*, and *Longer Tallons*? And whether *Children* may not have some *wash*, or Something to make their *Teeth* Better, and Stronger? *Coral* is in ule as an Help to the *Teeth* of *Children*.

SOME *Living Creatures* generate but at certaine *Seasons* of the *Yeare*; As *Deer*, *Sheep*, *Wild-Cones*, &c. And most Sorts of *Birds*, and *Fishes*: Others at any time of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The cause of *Generation* at all *Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all *Seasons*, are full of *Heat* and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deer* are a *Melancholy dry Creature*, as appeareth by their *Fearfulnesse*, and the *Hardnesse* of their *Flesh*. *Sheep* are a *Cold Creature*, as appeareth by their *Mildness*, and for that they seldom drink. Most sort of *Birds* are of a *drie Substance* in comparison of *Beasts*. *Fishes* are cold. For the second Cause, *Fulness of Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *wilde*, generate seldom, being *Tame*, generate often; Which is, from *Warmth*, and *Fulness of Food*. We finde, that the Time of *Going to Rut* of *Deere* is in *September*; For that they need the whole *Summers* *Feed* and *Grasse*, to make them fit for *Generation*. And if *Rain* come *Earely* about the *Middle* of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheep*, in respect of their small heat, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat* and *Comfort* of the *Spring* prepareth them. There is also another Reason, why some *Creatures* generate at certain *Seasons*: And that is the *Relation* of their Time of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilst the *Female* is full; Nor whilst she is busie in *Sitting*, or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Eggs* or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or four times, one after another.

Of *Living Creatures*, some are longer time in the *womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about fixe *Moneths*; *Does* goe about nine *Moneths*; *Mares* eleven *Moneths*: *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the Received *Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double Enquiry; The distance between the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe, between the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds* there is lesse *Diversity* of *Time*, than amongst other *Creatures*, yet some there is: For the *Hen* sitteth but three *Weekes*; The *Turkey Hen*, *Goose*, and *Ducke*, a *Moneth*: *Quere* of others. The Cause of the great difference of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the kind;

Experiments
in Consort,
touching the
Generation
and Bearing of
living Crea-
tures in the
wombe.

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Or from the *Constitution* of the *womb*. For the former, those that are longer in coming to their *Maturity* or *Growth*, are longer in the *womb*; As is chiefly seen in *Men*. And so *Elephants* which are long in the *womb*, are long time in coming to their full *Growth*. But in most other *Kinds*, the *Constitution* of the *womb*, (that is, the *Hardnesse*, or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure years of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a yeare, are but nine *Weekes* in the *Womb*. As for *Birds*, as there is lesse *Diversitie*, amongst them in the time of their *Bringing forth*; So there is lesse *Diversitie* in the time of their *Growth*; Most of them coming to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but One; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that *Kinde*; which if lesse be required, may admit greater *Number*; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments
in Consort,
touching
species visible.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorn*, in the *Bottom* of the *Water*. I have heard of a *Practice*, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Back*; whether (I say) he seeth *Things* in the *Aire*, greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *finer*, how it worketh I know not.

762

It would be well boulded out, whether great *Refractions* may not be made upon *Reflections*, as well as upon *Direct Beames*. For Example, Wee see, that take an *Empty Bason*, put an *Angel* of *Gold*, or what you will, into it; Then go so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflection*. To proceed therefore, put a *Looking-Glasse* into a *Bason* of *Water*; I suppose you shal not see the *Image* in a *right Line*, or at equall *Angles*, but aside. I know not whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*, Which for *beautie*, and *Strangenesse*, were a fine proof: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cisterne* or *Poole* of *Water*, you shal place over against it a picture of the *Devill*, or what you will so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Devills* Picture aside, not seeing the *water*, it will look like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked between two *Steeplas*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments
in Consort,
touching,
Impulsion, and
Percussion.

763

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, partly because *Motion* doth discusse the *Tor-pour* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, have in them a *Natural Appetite*, not to move at all, And partly, because a *Body* that *resteth*, doth get, by the *Resistance* of the *Body* upon which it *resteth*, a stronger *Compression*.

Compression of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weighty Body* be *Pensile*, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very near as easily, as if it were already in *Motion*.

A *Body Over-great*, or *Over-small*, will not be thrown so farre as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be too great, it yeeldeth too little; And if it be too small, it resisteth too little.

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid upon a *Body*, as falling, or stricken from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravity continued*, a *Compression* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Air* forwards. I conceive also, that the quick loose of that *Motion*, preventeth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (always,) is of great *Efficacy*; As appeareth in infinite *Instances*.

Tickling is most in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Joy-
ned with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawn along the *Lip* or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; Wee see no *Man* can *Tickle* himselfe: We see also that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be *Touched*. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, we see there is ever a *Starting*, or *Shrinking*, away of the *Part*, to avoid it; And we see also, that if you *Tickle* the *Nostrills* with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is ever *Painfull*, and not well endured.

It is strange, that the *River* of *Nilus*, Overflowing, as it doth, the *Countrey* of *Agypt*, there should be neverthelesse little or no *Raine* in that *Countrey*. The *Cause* must be, either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*: Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *waters* upon the *Fire* doe vapour so much, after some time of *Boyling*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent *Good* for the *Stone*, and *Hypochondriacall Melancholy*; VWhich sheweth it is *Lenifying*; And it runneth thorow a *Countrey* of a *Hot climate*, and flat, without *Shade*, either of *Woods* or *Hills*; VWhereby the *Sunne* must needs have great *Power* to *concoct* it. As for the *Ayre*, (from whence I conceive this want of *Showers* commeth chiefly;) The *Cause* must

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Experiment
Solitary tou-
ching Titilla-
tion.

766

Experiment
Solitary, tou-
ching the
Scarcity of
Raine in
Agypt.

767

must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as ever it getteth any Moisture from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary, touch-
ing Clarifi-
cation.

768

IT hath been touched in the *Title of Percolations*, (Namely such as are *Inwards*,) that the *Whites* of *Eggs*, and *Milk*, do clarify; And it is certain that in *Egypt*, they prepare and clarify the water of *Nile*, by putting it into great *Jars* of *Stone*, and Stirring it about with a few Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessel*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beer*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment
Solitary, touch-
ing Plants
without leaves.

769

There be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*, except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Egypt*, a *Plant* which is Long, Leavelesse, Brown of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *water* within *House*, spreadeth, and displayeth strangely; And the People thereabout have a Superstitious Beleeve, that in the *Labour* of *Women*, it helpeth to the easie *Deliverance*.

Experiment
Solitary, touch-
ing the
Materials of
Glasse:

770

THE *Chrystalline Venice Glasse*, is reported to be a Mixture, in equall Porti-
ons, of *Stones*, brought from *Parva*, by the River *Ticinum*, and the *ashes* of a
weed, called by the *Arabs* *Kall*, which is gathered in a *Desart* between *Alexan-*
dria, and *Rosetta*; And is by the *Egyptians* used first for *Fuell*; And then they
crush the *Ashes* into lumps, like a *Stone*; And so sell them to the *Venetians* for
their *Glasse-works*.

Experiment
Solitary, touch-
ing Prohibi-
tion of Putre-
faction, and
the long Con-
servation of
Bodies.

771

IT is strange, and well to be noted, how long *Carkasses* have continued *Un-*
corrupt, and in their former *Dimensions*; As appeareth in the *Mummies* of
Egypt; Having lasted, as is conceived, (some of them,) three thousand
yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take
forth the *Entrails*, which are the *Parts* aptest to corrupt. But that is no-
thing to the *VVonder*: For we see, what a Soft and corruptible *Substance*
the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that ac-
cording to our *Observation*, and *Axiome*, in our hundredth Experiment, *Putre-*
faction, which we conceive to be so *Naturall* a *Period* of *Bodies*, is
but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that
is conceived. And therefore *Bodies* in *Shining Amber*, In *Quick-Silver*, In
Balmes, (whereof we now speake,) In *Wax* In *Honey*, In *Gummes*, And (it
may be) in *Conservatories* of *Snow*, &c. are preserved very long. It need not
goe for Repetition, if wee resume againe that which wee said in the afore-
said Experiment, concerning *Annihilation*; Namely, that if you provide
against three Causes of *Putrefaction*, *Bodies* will not corrupt: The First is,
that the *Ayre* be *Excluded*; For that undermineth the *Body*, and conspireth
with the *Spirit* of the *Bodie* to dissolve it. The Second is, that the *Body* *Adja-*
cent and *Ambient*, be not *Commateriall*, but meerly *Heterogeneall* towards
the *Body* that is to be preserved: For if nothing can be received by the One,
Nothing can issue from the other; Such are *Quick-silver*, and *white Amber*,
to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preser-
ved, be not of that *Grosse*, that it may corrupt within it selfe, although no
Part of it issue into the *Body adjacent*: And therefore it must be, rather *Thin*,
and

and *Small*, than of *Bulk*. There is a fourth Remedy also, which is; That if the *Body* to be preserved be of *Bulk*, as a *Corps* is, then the *Body* that incloseth it, must have a *Virtue* to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; VVhereof the one contained the *Body* of King *Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seen, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *books*, they were found as fresh, as if they had been but newly *Written*; being written in *Parchment*, and covered over with *watch-candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the cause that the *Body* was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *body* to keep his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *body* was so *Tender*, as *Caesar* touching but the *Nose* of it, defaced it. Which maketh me finde it very strange, that the *Egyptian Mummies* should be reported to be as hard as *Stone-pitch*: For I finde no difference but one; VVhich indeed may be very *Materiall*; Namely, that the *Ancient Egyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-cloth*; VVhich it doth not appeare was practised upon the *Body* of *Alexander*.

Near the *Castle* of *Catie*, and by the *VVells* of *Ajan*, in the *Land* of *Idumea*, a great Part of the *VVay*, you would think the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such abundance of *Nitre* the *Shores* there doe put forth.

THE *Dead Sea*, which vomiteth up *Bitumen*, is of that *Crassitude*, as *Living Bodies* bound *Hand* and *foot*, cast into it, have been borne up, and not sunke. VVhich sheweth, that all sinking into *VVater*, is but an *Overweight* of the *Bodie*, put into the *VVater*, in respect of the *Water*; So that you may make *Water* so strong, and heavy, of *Quick-Silver*, (perhaps) or the like, as may beare up *Iron*: Of which I see no *Use*, but *Imposture*. We see also, that all *Metalls* except *Gold*, for the same reason swimme upon *Quicke-Silver*.

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *blacke-Stone* (whereof *Pilgrims* make *Fires*), which burneth like a *coale*, and diminisheth not; But only waxeth *Brighter* and *Whiter*. That it should doe so, is not strange; For we see *Iron* *Red Hot* burneth, and consumeth not: But the *Strangenesse* is, that it should continue any time so: For *Iron*, as soone as it is out of the *Fire*, deadeth straight-ways. Certainly, it were a *Thing* of great *Use*, and *Profit*, if you could finde out *Fuell*, that would burne *Hot*, and yet last long: neither am I altogether *Incredulous*, but there may be such *Candles*, as they say are made of *Salamanders Wool*; Being a kind of *Minerall*, which whiteneth also in the *Burning*, and consumeth not. The *Question* is this; *Flame* must be made of somewhat; And commonly it is

Experiment
Solitary, touching the
Abundance of
Nitre in
certaine *Sea-Shoares*.

772

Experiment
Solitary, touching *Bodies*
that are borne
up by *water*.

773

Experiment
Solitary, touching *Fuell*
that consumeth
little, or nothing.

774

is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*, (which *Spirit* or *Vapour* hath no *Weight*;) such as is the matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oyle*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *VViecke* not burne.

Experiment
Solitary Oeco-
nomicall tou-
ching Cheape
Fuell.

775

Sea-Coale last longer than Char-coale; And Char-coale of Roots, being Coaled into great Pecces, last longer than Ordinary Char-coale. Turfe and Peat, and Cow-Sheards, are cheape Fuells, and last long. Small-coale, or Char-coale, powred upon Char-coale, make them last longer. Sedge is a cheap Fuell to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of Sea-coale with Earth, or Chalke; For if that Mixture be, as the Sea-coale-Men use it, privily, to make the Bulke of the Coale greater, it is Deceit; But if it be used purposely, and bee made knowne, it is Saving.

Experiment
Solitary, tou-
ching the
Gathering of
winde for
Freshnesse.

776

IT is, at this Day, in use, in Gaza, to couch Pot-sheards or Vessels of Earth, in their VValls, to gather the VVind from the Top, and to passe it downe in Spouts into Roomes. It is a Device for Freshnesse, in great Heats: And it is said, there are some Roomes in Italy, and Spaine, for Freshnesse, and gathering the VVinds, and Aire, in the Heats of Summer. But they be but Pennings of the VVinds, and Enlarging them againe, and making them Reverberate, and goe Round in circles, rather than this Device of Spouts in the VVall.

Experiment
Solitary, tou-
ching the
Trialls of Airs.

777

THere would be used much diligence, in the Choice of some Bodies, and Places, (as it were,) for the Tasting of Aire; to discover the VVholesomenesse, or VVnwholesomenesse, as well of Seasons, as of the Seats of Dwellings. It is certaine, that there be some Houses, wherein Confitures, and Pies, will gather Mould, more than in Others. And I am perswaded, that a Peece of Raw Flesh, or Fish, will sooner corrupt in some Aires, than in Others. They be noble Experiments, that can make this Discovery; For they serve for a Naturall Divination of Seasons; Better than the Astronomers can by their Figures: And againe, they teach Men where to chuse their Dwelling, for their better Health.

Experiment
Solitary, tou-
ching Increa-
sing of Milke
in Milch
Beasts.

778

THere is a Kinde of Stone, about Bethleem, which they grinde to Powder, and put into VVater, whereof Cattle drinke; Which maketh them give more Milke. Surely, there would be some better Trialls made of Mixtures of VVater in Ponds for Cattle, to make them more Milch; Or to Fatten them; Or to Keep them from Murraine. I may bee, Chalke, and Nitre, are of the best.

Experiment
Solitary, tou-
ching Sand
of the Nature
of Glasse.

779

IT is reported, that in the Valley, neare the Mountaine Carmel, in Judea, there is a Sand, which, of all other, hath most Affinitie with Glasse. Inso-much as other Mineralls, laid in it, turne to a Glasse Substance, without the Fire; And againe Glasse put into it, turneth into the Mother-Sand. The Thing is very strange, if it be true: And it is likeliest to be Caused by some Naturall Furnace, of Heat in the Earth: And yet they doe not speak of any Eruption of Flames. It were good to trie in Glasse-works, whether the Crude Materialls of Glasse, mingled with Glasse, already made and Re-moulten, doe not facilitate the Making of Glasse with lesse heat.

IN the Sea, upon the South-West of Sicily, much Corall is found. It is a Sub-Marine Plant. It hath no Leaves: It brancheth onely when it is under Water; It is Soft, and Green of Colour; But being brought into the Aire, it becommeth Hard and Shining Red, as wee see. It is said also, to have a white Berry; But we finde it not brought over with the Corall. Belike it is cast away as nothing worth: Inquire better of it, for the Discovery of the Nature of the Plant.

Experiment
Solitary touching the
Growth, of
Corall.
780

THe Manna of Calabria is the best, and in most Plenty. They gather it from the Lease of the Mulberry Tree; But not of such Mulberry Trees, as grow in the Valley's. And Manna falleth upon the Leaves by Night, as other Deawes doe. It should seem, that before those Deawes come upon Trees in the Valley's, they dissipate and cannot hold out. It should seeme also, the Mulberry-Leaf, it selfe hath some Coagulating Vertue, which inspissateth the Deaw, for that it is not found upon other Trees: And we see by the silke-worm, which feedeth upon that Lease, what a dainty Smooth Iuyce it hath; and the Leaves also, (especially of the Black Mulberry,) are somewhat Bristly, which may help to preserve the Deaw. Certainly, it were not amisse, to observe a little better, the Deaws that fall upon Trees, or Herbs, Growing on Mountains: For it may be, many Deaws fall, that spend before they come to the Valley's. And I suppose, that he that would gather the best May-Deaw for Medicine, should gather it from the hills.

Experiment
Solitary, touching the
Gathering of
Manna.
781

IT is said, they have a manner, to prepare their Greeke-Wines, to keepe them from Fuming, and Inebriating, by adding some Sulphur, or Allome: Whereof the one is Unduous, and the other is Astringent. And certaine it is, that those two Natures doe repress the Fumes. This Experiment would be transferred unto other Wine and Strong Beer, by Putting in some like Substances, while they work; Which may make them both to Fume lesse, and to Inflame lesse.

Experiment
Solitary, touching the
Correcting of
Wine.
782

IT is conceived by some, (not improbably,) that the reason, why wilde-Fires (Whereof the principall Ingredient is Bitumen,) doe not quench with Water, is, for that the first Concretion of Bitumen, is a Mixture, of a Fiery, and Watry Substance: So is not Sulphur. This appeareth, for that in the Place near Puteoli, which they call the Court of Vulcan, you shall heare under the Earth a Horrible Thundring of Fire, and Water, conflicting together: And there breake forth also Spouts of Boyling Water. Now that Place yeeldeth great Quantities of Bitumen; Whereas Aetna, and Vesuvius, and the like, which consist upon Sulphur, shoot forth Smoak, and Ashes, and Pumice, but no Water. It is reported also, that Bitumen Mingled with Lime, and Put under Water, will make, as it were, an artificiall Rocke, The Substance becommeth so Hard.

Experiment
Solitary touching the
Materialls of
wilde-Fire.
783

THere is a Cement, compounded of Flower, whites of Egges, and Stone powdered, that becommeth Hard as Marble; wherewith Piscina Mirabilis, neer Cuma, is said to have the Walls Plastered. And it is certaine, and tried, that the Powder of Loadstone, and Flint, by the Addition of whites of Eggs, and Gumm-Dragon, made into PASTE, will in a few dayes harden to the Hardnesse of a Stone.

Experiment
Solitary, touching Plaster
growing as
hard as Marble
784

Experiment
Solitary, touch-
ing judgment of the
Cure in some
Ulcers and
Hurts.

785

IT hath beene noted by the *Ancients*, that in *Full*, or *Impure Bodies*; *Ulcers* or *Hurts* in the *Legges*, are Hard to Cure; And in the *Head* more easie. The Cause is, for that *Ulcers* or *Hurts* in the *Legges* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Ulcers* in the *Head* require it not; But contrariwise *Dryness* maketh them more apt to Consolidate. And in *Moderne Observation*, the like difference hath been found, between *French-men*, and *English-men*; whereof the ones *Constitution* is more *Dry*, and the others more *Moyst*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-man*, and of the *Legge* in an *English-Man*.

Experiment
Solitary, touch-
ing the
Healthfulnesse
or Unhealth-
fulnesse of the
Southern winds

786

IT hath been noted by the *Ancients*, that *Southern Winds*, blowing much, without *Rain*, doe cause a *Fevourous Disposition* of the *Reare*; But with *Rain*, not. The Cause is, for that *Southern Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry Heat of the *Southern Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the vapour of the *Sea*, without *Showers*, doth refresh.

Experiment
Solitary, touch-
ing Wounds.

787

IT hath been noted by the *Ancients*, that *Wounds* which are made with *brasse*, heale more easily, than *Wounds* made with *Iron*. The Cause is, for that *Brass* hath, in it selfe, a *Sanative vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosive*, and not *Sanative*. And therefore it were good, that the Instruments which are used by *Chirurgions* about *wounds*, were rather of *Brasse*, than *Iron*.

Experiment
Solitary, touch-
ing Mortifi-
cation by Cold.

788

IN the *Cold Countries*, when *Mens Noses* and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a *Fire*, they rot off presently. The cause is, for that the few *spirits*, that remaine in those *Parts*, are suddenly drawn forth, and so *Putrefaction* is made Compleat. But *Snow* put upon them helpeth; For that it preserveth those *Spirits* that remain, till they can revive; And besides, *Snow* hath in it a secret warmth: As the *Monk* proved out of the Text, *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. VVhereby he did inferre, that *Snow* did warme like *wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the *Pores*, without any sudden VVorking upon the *Spirits*. This Experiment, may be transferred unto the Cure of *Gangrenes*, either coming of themselves, or induced by too much applying of *Opiates*: VVherein you must beware of *Drie heat*, and resort to things that are *Refrigerant*, with an *Inward warmth* and *Vertue* of Cherishing.

Experiment
Solitary, touch-
ing weight.

789

WEigh *Iron*, and *Aqua-Fortis*, severally; Then dissolve the *Iron* in the *Aqua-Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good weight, as the *Bodies* did severally: Notwithstanding a good deale of VVast, by a thick vapour, that issueth during the *Working*: VVhich sheweth that the *Opening* of a *Body*, doth increase the weight. This was tried once or twice, but I know not whether there were any *Errour*, in the *Triall*.

Experiment
Solitary, touch-
ing the Sta-
tion of Bodies.

790

TAke of *Aqua-Fortis* two Ounces, of *Quick-silver* two Drachmes, (For that Charge the *Aqua-Fortis* will bear;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the increasing of the weight of wa-
ter

ter will increase his *Power of Bearing*; as we see *Broine*, when it is Salt enough, will beare an *egge*. And I remember well a *Physician*, that used to give some *Mineral Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary Water. But it seemeth, the *weight* of the *Quick-silver*, more than the *weight* of a *Stone*; doth not compense the *weight* of a *Stone*, more than the *weight* of the *Aqua-Fortis*.

Let there be a *Body* of *Vnequall weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *weightier End* will recover to be forwards; Unlessse the *Body* be *Over-long*. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause* (though heretofore not found out, as hath beene often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure of Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turn over: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well; That if an *Open Trough*, wherein *water* is, be driven faster then the *water* can follow, the *Water* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneeth the *Water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequality* of the *Pressure of Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone* or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching the Flying of Vnequall Bodies in the Aire.

791

It is certain, (as it hath been formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottom* of the *water*, it maketh a *Sound*. So a long *Pole* struck upon *Gravell*, in the *Bottom* of the *water*, maketh a *Sound*. Nay, if you should think that the *Sound* cometh up by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no *Solide Body*, whereby the *Sound* can ascend.

Experiment Solitary, touching water, that it may be the Medium of Sounds.

792

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horror*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, we see, that in the *Taking* of a *Potion*, or *Pills*, the *Head*, and the *Neck*, shake. For *Odious Smells* the like *Effect* followeth, which is lesse perceived, because there is a *Remedy* at hand, by *Stopping* of the *Nose*: But in *Horses*, that can use no such *Help*, we see the smell of a *Carrion*, especially of a *Dead horse*, maketh them fly away, and take on, almost as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnes* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiver*.

Experiment Solitary of the Flight of the Spirits upon Odious objects

793

There is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Windowes* onely from above: It is in *Length* an *Hundred Feet*, in *Breadth* *Twenty Feet*, and in *Height* neare *Fifty*; Having a *Door* in the *Middest*. It reporteth

Experiment Solitary, touching the Super-Reflexion of Eccho's;

794

porteth the Voice, twelve or thirteene times, if you stand by the Close *End-wall*, over against the *Door*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-Charenton* doth. And the Voice soundeth, as if it came from above the *Door*. And if you stand at the *Lower End*, or on either *Side* of the *Door*, the *Eccho* holdeth; But if you stand in the *Door*, or in the *Middest* just over against the *Door*, not. Note that all *Eccho's* sound better against *old walls*, than *New*; Because they are more *Dry* and *hollow*.

Experiment
Solitary, touch-
ing the
Force of Im-
agination, Im-
aginating that of
the Sense.

795

THose Effects, which are wrought by the *Percussion* of the *Sense*, and by *Things in Fact*, are produced likewise in some degree, by the *Imagination*. Therefore if a Man see another eat *Sour* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his own *Teeth* also set on edge. So if a Man see another turn swiftly, and long; Or if he look upon *wheels* that turne, Himselfe waxeth *Turne-sick*. So if a Man be upon an *High Place*, without *Rails*, or good *Hold*, except he be used to it, he is Ready to *Fall*: For *Imagining a Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment
Solitary, touch-
ing *Preser-*
vation of
Bodies.

796

TAKE a *Stock-Gilly-Flower*, and tie it gently upon a *Sticke*, and put them both into a *Stoope Glasse*, full of *Quicksilver*, so that the *Flower* be covered: Then lay a little *weight* upon the *Top* of the *Glasse*, that may keepe the *Sticke* downe; And looke upon them after foure or five dayes; And you shall finde the *Flower* Fresh, and the *Stalk* Harder, and lesse *Flexible*, than it was. If you compare it with another *Flower*; gathered at the same time, it will be the more manifest. This sheweth that *Bodies* doe preserve excellently in *Quick-silver*; and not preserve only, but, by the *Coldness* of the *Quicksilver* *Indurate*; For the *Freshness* of the *Flower* may be meerly *Conservation*; (which is the more to be observed, because the *Quick-silver* presseth the *Flower*;) But, the *Stiffness* of the *Stalke*, cannot be without *Induration*, from the *Cold* (as it seemeth,) of the *Quick-silver*.

Experiment
Solitary touch-
ing the
Growth, or
Multiplying of
Metalls.

797

IT is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kind* of *Iron*, that being cut into *Little Peeces*, and put into the *Ground*, if it be well *watered*, will increase into *Greater Peeces*. This is certaine, and known of *Old*; That *Lead* will multiply, and Increase; As hath been seen in *Old Statues* of *Stone*, which have been put in *Cellars*; The *Feet* of them being bound with *Leaden bands*; Where (after a time) there appeared, that the *Lead* did swell; In so much as it hanged upon the *stone* like *warts*.

Experiment
Solitary, touch-
ing the
Drowning of
the more *Base*
Metall in the
more *Precious*.

798

I Call *drowning* of *Metals*, when that the *Baser Metall*, is so incorporat with the more *Rich*, as it can by no *Meanes* be separated againe: which is a kinde of *Version*, though *False*: As if *Silver* should be inseparably incorporated with *Gold*: Or *Copper*, and *Lead*, with *Silver*. The *Ancient Elestrum* had in it a fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit, for most uses, as *Gold*; and more *Resplendent*, and more *Qualified* in some other *Properties*; But then that was easily *Separated*. This to doe privily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it bee done avowedly, and without *Disguizing*, it may be a great *Saving* of the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a *Fifteenth Part* of *Silver*, incorporate with *Gold*,

Gold, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantity* of *Silver*, to draw to it the *Lesse*; which (hee said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*), will not be detected; If you take so much the more *Silver*, as will countervaille the *Over-weight* of the *Lead*.

G*old* is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* sheweth that it is not *Jejune*, or *Scarce* in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glass Re-moulten* do leese any *Weight*? For the *Parts* in *Glasse* are evenly Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As wee see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Jejunenesse* or *Extreme Comminution* of *Spirits*: of which Three, the two First may be joyned with a *Nature Liquefiable*; The Last not.

Experiment
Solitary, touching
Fixation
of Bodies.

799

IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it with a kinde of *Thirst*, as not satisfied with his own former *Consistence*; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Drie* and more *Terrestriall Bodies*, Proportionable: And *Drie Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*), *One is a Glue to another*, *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Ashes*; Not apparently *Porous*: *Metalls* themselves doe receive in readily *Strong-waters*; And *Strong-waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-water* will touch upon *Gold*, that will not touch upon *Silver*; And *è Converso*. And *Gold*, which seemeth by the *Weight*, to be the Closest, and most *Solide Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not *Violent*: For it is (many times) *Reciprocall*, and as it were with *Consent*. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandering Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either to overcome and turne another *Body* into it Selfe, as by *Victory*; Or it Selfe to dye, and goe out.

Experiment
Solitary, touching the
Restlesse Nature
of Things
in Themselves
and their Dis-
position to change.
800

NATVRALL HISTORIE.

IX. Century.



IT is certaine, that all *Bodies* whatsoever, though they have no *sense*, yet they have *Perception*: For when one *Body* is applyed to another, there is a Kinde of *Election*, to embrace that which is *Agreeable*, and to exclude or expell that which is *Ingrate*: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* preceedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *sense*; So that the *sense* is but a dull thing in Comparison of it: We see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; as when the *Load-stone* draweth *Iron*; or *Flame* fireth *Naptha* of *Babylon*, a great distance of, It is therefore a Subject of a very Noble *Enquiry*, to enquire of the more *subtill Perceptions*; For it is another *Key* to open *nature* as well as the *sense*; and sometimes better. And besides, it is a Principall *Meanes* of *naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*;

Experiments
in Consort,
touching *Per-
ception* in *Bo-
dies Insensible*,
tending to
*Naturall Divi-
nation*, or,
Subtill Trials.

Come; As it is in many *Subtill Trialls*; As to trie whet her Seeds be old, or new, the *sense* cannot informe: But if you boile them in *Water*, the new seeds will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; but the *speedy consuming* of it, and many other *Meanes*, which wee have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall inclinations* of the *Minde*, which *dissimulation* will conceale, or *Discipline* will suppress. We shall therefore now handly onely, those two *Perceptions*, which pertaine to *Naturall divination*, and *Discovery*: Leaving the *Handling* of *Perception* in other things, to be disposed elsewhere. Now it is true, that *divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*: you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *discovery* chiefly, which is cause by an *Early*, or *subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to *Corrupt* or *Putrifie*, (noe doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. We will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vn-wholesome Teares*.

801

The *wind* blowing much from the *South*, without *Raine*; And *wormes* in the *Oake-Apple*; have been spoken of before. Also the *Plenty* of *Frogs*, *Grasshoppers*, *Flies*, and the like creatures bred of *Putrefaction*, doth portend *Pestilentiall Teares*.

802

Great, and *Early Heats* in the *Spring*, (and namely in *May*), without *Winds*, portend the same, And generally so doe *Teares* with little *wind*, or *Thunder*.

803

Great Droughts in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showers* upon them; And then some *Drie weather* again; Doe portend a *Pestilent Summer*, the *Yeare* following: for about the *End* of *August*, all the *Sweetness* of the *Earth*, which goeth into *Plants* or *Trees*, is exhaled; (And much more if the *August* be drie;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to *Corrupt* the *Aire*: And that *vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soon after those *showers*, are commonly taken with *sicknesse*. And in *Affricke*, no *Body* will stirre out of doores after the first *Showers*. But if the first *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Dry weather* come againe, then it fixeth and continueth the *corruption* of the *Aire*, upon the first *Showers* begun; And maketh it of ill *Influence*, even to the *Next Summer*; Except a very *Frostie Winter* discharge it; Which feldome succedeth such *Droughts*.

804

The *Lesser Infections*, of the *small Pocks*, *Purple Feavers*, *Agues*, in the *summer*

mer Precedent, and hovering all winter, do portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a Signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quick or late, except you compare this Experiment with the like Experiment in another Yeare, it were not amisse in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open aire, and another of the same Kinde and Bignesse, within Doores: For I judge, that if a general Disposition be in the Air to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likeliest to discover, what the Winter hath done; And what the Summer following will doe upon the Aire. And because the Aire (no doubt) receiveth great Tincture, and Infusion from the Earth; It were good to try that Exposing of Flesh, or Fish, both upon a Stake of Wood, some height above the Earth, and upon the Flat of the Earth.

Take May-Dew, and see whether it putrefie quickly, or no? For that likewise may disclose the Quality of the Aire, and Vapor of the Earth, more or lesse Corrupted.

A Dry March, and a Dry May, portend a Wholesome Summer, if there bee a Showring April betweene: But otherwise, it is a Signe of a Pestilentiall Yeare.

As the Discovery of the Disposition of the Aire, is good for the Prognosticks of Wholesome, and Unwholesome Yeares; So it is of much more use, for the Choice of Places to dwell in: At the least, for Lodges, and Retiring Places for Health; (For Mansion Houses respect Provisions, as well as Health;) Wherein the Experiments above mentioned may serve.

But for the Choice of Places, or Seats, it is good to make Tryall, not onely of aptnesse of Aire to corrupt, but also of the Moisture and Drinesse of the Aire; and the Temper of it, in Heat or Cold; For that may concerne Health diversly. We see that there be some Houses, wherein Sweet Meats will relent, and Baked Meats will mould, more than in others; And Wainscots will also sweat more; so that they will almost run with water: All which, (no doubt) are caused chiefly by the Moistnesse of the Aire, in those Seats. But because it is better to know it, before a Man buildeth his House, than to finde it after, take the Experiments following.

Lay VVool, or a Sponge, or Bread, in the Place you would try, comparing it with some other Places; and see whether it doth not moisten, and make the VVool, or Sponge, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a Grosse and Moist Ayre.

Because it is certain, that in some Places, either by the Nature of the Earth, or by the Situation of Woods, and Hills, the Aire is more Unequall, than in Others; And Inequality of Aire is ever an Enemy to Health; It were good to take two Weather-Glasses, Matches in all things, and to set them, for the same Houres of One day, in several places, where no Shade is, nor Enclosures: And to mark when you set them, how farre the Water commeth; And to compare them, when you come againe, how the Water standeth then: And if you finde them Unequall, you may be sure that the Place where the Water is lowest, is in the Warmer Aire, and the other in the Colder. And the greater the Inequality be, of the Ascent, or Descent of the Water, the greater is the Inequality of the Temper of the Aire.

812

The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne ; As well for the *Discovery* of the *Causes*, as for divers *Provisions*. That of *Plenty* of *Hawes* and *Heps*, and *Briar-Berries*, hath been spoken of before. If *Wainscoat*, or *Stone*, that have used to *Sweat*, be more dry in the Beginning of *Winter* ; Or the *Drops* of the *Eaves* of *Houses* come more slowly downe, than they use ; it portendeth a *Hard* and *Frostie Winter*. The *Cause* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie weather* ; which in *Winter* is ever joyned with *Frost*.

813

Generally, a *Moist* and a *Cool Summer*, portendeth a *Hard Winter*. The *Cause* is, for that the *Vapours* of the *Earth*, are not dissipated in the *Summer*, by the *Sunne* ; And so they rebound upon the *Winter*.

814

A *Hot* and *Dry Summer*, and *Autumne*, and especially if the *Heat* and *drought* extend far into *September*, portendeth an *Open Beginning* of *Winter*, and *Colds* to succeed, toward the latter Part of the *Winter*, and the Beginning of the *Spring* : For till then, the former *Heat* and *Drought* beare the *Sway* ; and the *Vapours* are not sufficiently Multiplied.

815

An *Open* and *Warmed Winter* portendeth a *Hot* and *Dry Summer* : For the *Vapours* disperse into the *Winter Showers* ; Whereas *Cold* and *Frost* keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

816

Birds that use to change *Countries*, at certaine *Seasons*, if they come *Earlier*, doe shew the *Temperature* of *Weather*, according to that *Countrey* whence they came : As the *Winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us shew *Cold Winters*. And if it be in the same *Countrey*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come : As *Swallows*, *Batts*, *Cuckoes*, &c. that come towards *Summer*, if they come earely, shew a *Hot Summer* to follow.

817

The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* upon the *Shoare* ; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*, shew *Wind* to follow : For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much.

818

The *Upper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below : And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kind you shall finde a Number of *Instances* in our *Inquisition de Ventis*.

819

Great Mountaines have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valleys* or *Plaines* below : And therefore they say in *Wales*, when certaine *Hills* have their *Night-Caps* on, they mean *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it.

820

The *Aire*, and *Fire*, have *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *Wind*, that otherwise we doe not feele : And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be unquiet : And so doe *Coales* of *Fire* by casting off the *Ashes* more then they use. The *cause* is, for that no *Wind*, at the first, till it hath strook and driven the *Aire*, is apparent to the *Sense* : But *Flame* is easier to move, than *Aire* : And for the *Ashes*, it is no marvell, though *Winds* unperceived shake them off ; For wee usually try, which way the *Wind* bloweth,

bloweth, by casting up *Grasse*, or *Chasse*, or such light things into the *Aire*.

When *Wind* expireth from under the *Sea*; as it causeth some *Resoundings* of the *Water*, (whereof we spake before,) so it causeth some *Light Motions* of *Bubbles*, and *white Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quantity*, frō under the *Water*; And so it getteth into a *Body*: Whereas in the first *Patting up* it commeth in little *Portions*.

We spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chasse* carried by the *Wind*; So any *Light Thing* that moveth, when we find no *Wind*, sheweth a *Wind* at hand: As when *Feathers*, or *Down* of *Thistles*; fly to and fro in the *Aire*.

For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*) must needs have a *Quicker Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds* who live in the *Aire*, freest, and clearest; and are aptest by their *Voyce* to tell *Tales*, what they finde; and likewise by the *Motion* of their *Flight* to expresse the same.

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they flock and fly together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallows*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both *Kindes* take in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and upon the *VVing*, whithersoever they would otherwise goe: For it is no *Marvell* that *VVater-Fowle* doe joy most in that *Aire*, which is likest *VVater*; And *Land-Birds*, also, (many of them) delight in *Bathing*, and *Moist ayre*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seem to call upon *Raine*: All which is but the *Comfort* they seem to receive in the *Relenting* of the *Aire*.

The *Heron*, when she soareth high, (so as sometimes she is seen to passe over a *Cloud*;) sheweth *VVinds*: But *Kites* flying aloft, shew *Faire* and *Dry weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that *Temper*, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is *Condensed*: And besides, being but *Heavy* of *Wing*, needeth the Help of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossnesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird of Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swim against the *Streame*. And yet it is true also, that all *Birds* finde an *Ease* in the depth of the *Aire*; As *Swimmers* doe in a *Deep Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spread*, scarce moving them.

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Drie*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will flye it, and swim lower.

Beasts doe take *Comfort*, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheep* will get up betimes in the

the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conies*, will feed hard before *Raine*: And a *Heifer*, will put up his *Nose*, and snuffe in the *Ayre*, against *Raine*.

827 The *Trifoile*, against *Raine*, swelleth in the *Stalk*; and so standeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red Flower in the *Stubble-Fields*, which *Countrey People* call the *VVincopipe*; which if it open in the *Morning*, you may be sure of a fair *Day* to follow.

828 Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Frost*: For the One maketh the *Humours* more to *Abound*, and the Other maketh them *Sharper*. So we see both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-shew (likewise) *Rain*: For *Earth-wormes* will come forth, and *Moules* will cast up more, and *Fleas* bite more, against *Raine*.

830 *Solide Bodies* likewise fore-shew *Raine*. As *Stones*, and *Wainscot*, when they *Sweat*: And *Boxes*, and *Pegges* of *Wood*, when they *Draw*, and *Wind hard*; Though the Former be but from an *Outward Cause*; For that the *Stone*, or *Wainscot*, turneth and beateth back the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

Experiment
Solitary, touch-
ing the
Nature of
Appetite in the
Stomach.

831

Appetite is moved chiefly by Things that are *Cold*, and *Dry*; The Cause is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon *Supply*; And so is *Drinesse*: And therefore all *Soure Things*, (as *Vinegar*, *Juyce* of *Lemons*, *Oyle* of *Vitrioll*, &c.) provoke *Appetite*. And the *Disease* which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acide* and *Glassy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moved by *Soure Things*; For that *Soure Things* induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*, which is a great Cause of *Appetite*. As for the Cause why *Onyons*, and *Salt*, and *Pepper*, in *Baked Meats*, move *Appetite*, it is by *Vellication* of those *Nerves*; For *Motion* whetteth. As for *Wormewood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they move *Appetite* by *Abstersion*. So as there be foure Principall Causes of *Appetite*; The *Refrigeration* of the *Stomach* joyned with some *Drinesse*; *Contraction*; *Vellication*; And *Abstersion*: Besides *Hunger*, which is an *Emptinesse*: And yet *Over-fasting* doth (many times) cause the *Appetite* to cease; For that want of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are *Light*, and *Cholerick*, which quench *Appetite* most.

Experiment
Solitary, touch-
ing Sweet-
ness of: Odour
from the
Rain-bow.

832

IT hath beene observed by the *Ancients*, that where a *Raine-Bow* seemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The Cause is, for that this happeneth but in certain Matters, which have in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground Sweet*: But none are so delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be also, that the *water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possible fall, but from the *Aire*, that is very *Low*: And therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled water*: For *Raine*, and other *Dew*, that fall from high, cannot preserve the *Smell*, being dissipated in the drawing up: neither doe we know, whether some *Water* it selfe may not have some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *River*, nor

nor *Fountain*; but good *Earth*, newly turned up, hath a *freshness* and good *scent*; which *Water*, if it be not too equall, (for equall *objects* never move the *Sense*) may also have. Certaine it is, that *Bay-Salt*, which is but a kind of *Water* congealed, will sometimes smell like *Violets*.

TO *Sweet Smells* heat is requisite, to Concoct the *Matter*; and some *Moisture* to Spread the *Breath* of them. For heat, we see that *Woods*, and *Spices*, are more *Odorate* in the *hot Countries*, than in the *cold*: for *Moisture*, we see that things too much dried, lose their *Sweetnesse*: and *Flowers* growing, smell better in a Morning or Evening, then at Noone. Some *Sweet Smells* are destroyed by approach to the *Fire*; as *Violets*, *Wall-flowers*, *Gilli-flowers*, *Pinks*; and generally all *Flowers* that have *coole* and *dellicate Spirits*. Some continue both on the *fire*, and from the *fire*; as *Rose-water*, &c. Some do scarce come forth, or at least not so pleasantly, as by means of the *fire*; as *Iuniper*, *Sweet-Gums*, &c. And all *Smells*, that are enclosed in a *Fast Body*: but (Generally) those *Smells* are the most gratefull, where the *Degree* of heat is small; or where the strength of the *Smell* is allayed; for these things do rather wooe the *Sense*, then satiate it. And therefore the *smell* of *Violets*, and *Roses* exceedeth in *sweetnesse* that of *spices*, and *Gumms* and the strongest sort of *smells*, are best in a *west*, *afarre off*.

Experiment
Solitary touching
Sweet Smells.

833

IT is certaine, that no *smell* issueth, but with *Emission* of some *Corporeall Substance*, Not as it is in *Light*, and *Colours*, and in *Sounds*, For we see plainly, that *Smell* doth spread nothing that distance, that the other doe. It is true, that some *Woods* of *Orenges*, and *Heaths* of *Rose-mary*, will Smell a great way into the *Sea*, perhapstwenty Miles; But what is that, since a *Peale* of *Ordnance* will doe as much, which moveth in a small *Compasse*? Whereas those *Woods* and *Heaths*, are of *Vast Spaces*: Besides, we see that *Smells* doe adhere to *Hard Bodies*; As in perfuming of *Gloves*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary touching the
Corporeall Substance of *Smells*

834

THE *Excrements* of most *Creatures* smell ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept *Sweet*; And so of *Cage-Birds*: And the *Cat* burieth that which she voideth: And it holdeth chiefly in those *Beasts*, which feed upon *Flesh*. *Dogs* (almost) onely of *Beasts* delight in *Fetide Odours*, Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the *Body* it selfe rejecteth them; Much more the *Spirits*: And wee see, that those *Excrements* that are of the *First Digestion*, Smell the worst; As the *Excrements*, from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Vrine*, and those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mouldy*. The *Cause* may bee, for that *Putrefaction* doth bring forth such a *Consistence*, as is most *Contrary* to the *Consistence* of the *Body*, whilest it is *Sound*: For it is a meere dissolution of that *Forme*. Besides, there is another *Reason* which is *Profound*: And it is, that the *objects* that please any of the *senses*, have (all) some *Equality*, and (as it were) *Order* in their *Composition*: But where those are wanting, the *Object* is ever *Ingrate*. So *Mixture* of many *Disagreeing colours* is

Experiment
Solitary, touching
Fetide and *Fragrant Odours*.

835

is never unpleasant to the *Eye*: Mixture of *Disordant sounds* is unpleasant to the *Eare*: Mixture, or *hotch-potch* of many *tastes*, is unpleasant to the *Tast*: Harshnesse and Ruggednesse of Bodies, is unpleasant to the *Touch*: Now it is certaine that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed* Mixture of the Part. Neverthelesse, it is strange, and seemeth to crosse the former Observation, that some *Putrefactions* and *Excrements* do yeeld excellent *Odours*; as *Civet* and *Muske*; and as some thinke *Amber-Greece*: For divers take it, (though unprobably,) to come from the *Sperme* of *Fish*: and the *Mosse* we spake off from *Apple-Trees*, is little better then an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also joyned with a further Cause, which is more subtile; and it is, that the *Senses* love not to be Over-pleased; But to have a Commixture of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musicke*, falling upon *Concords*, make the *Sweetest Strains*: and we see againe, what strange *tastes* delight the *Tast*; as *Red-Herrings*, *Caviary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kind of *Smells*, that we have mentioned, are all strong, and do Pull and Vellicate the *Sense*. And we find also, that places where Men *Vrine*, commonly have some *Smell* of *Viclets*: And *Vrine*, if one hath eaten *Nutmeg*, hath so too.

The Slothfull, Generall, and Indefinite Contemplations, and Notions, of the *Elements*, and their *Conjugations*; Of the *Influences* of *Heaven*; Of *Hot*, *Cold*, *Moysture*, *Drought*, *Qualities Active*, *Passive*, and the like; have swallowed up the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being but *Notionall*, and ill *Limited*; and *Definite Axiomes* are to be drawn out of measured *Instances*: and so assent to be made to the more *Generall Axioms*, by *Scale*. And of these *Kinds* of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment
Solitary, touch-
ing the Causes of
Putrefaction.

836

ALL *Putrefactions* come chiefly from the inward *Spirits* of the *Body*, and partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else. And this last, by no *Means*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Solicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrin* and *Preternaturall heat*, it is but *Nugation*: For *Cold* in things *Inanimate*, is the greatest enemy that is to *Putrefaction*; though it extinguisheth *Vivification*, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine heat*, it is thus farre true; That if the Proportion of the *Adventine heat*, be greatly predominant, to the *Naturall heat*, and *Spirits* of the *Body*, it tendeth to *dissolution*, or notable alteration. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*, and also by the *Disordination*, and *Discomposure* of the *Tangible Parts*; and other *Passages* of *Nature*; and not by a *Conflict* of heats.

In

IN *Versions*, or *Main Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body* resulting; which *Medium* is *Corpus imperfectè Mistum*, and is *Transitory*, and not durable; As *Mists*, *Smokes*, *Vapours*, *bylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a *Kinde of Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary, touching *Bodies imperfectly Mixt.*

837.

THe word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speak of *Meat Concocted*; *Urine* and *Excrements Concocted*; And the *Four Digestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the *Workes of Heat*: All which *Notions* are but ignorant *Catches* of a few things, which are most obvious to *Mens Observations*. The *Constantest Notion* of *Concoction* is, that it should signifie the *Degrees of Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; which is the *Ulimity* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first *Forme*, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Crudity* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Work of Heat*: But not the *Work of Heat* alone: For all things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Means to Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the *Former* is most conspicuous in the *Bodies of Living Creatures*; In which there is an *Absolute Conversion* and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies of Plants*: And again in *Metalls*, where there is a full *transmutation*. The other, (which is *Maturation*) is seen in *Liquours* and *Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Form*, which is most sought, for *Mans use*; As in *Clarifying* of *Drinks*, *Ripening* of *Fruits*, &c. But note, that there be two *Kind*es of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body* which was before; As when *Nourishment* is turned into *Flesh*; That is it which we call *Assimilation*. The other is, when the *Conversion* is into a *Body* merely *New*, and which was not before; As if *Silver* should be turned to *Gold*, or *Iron* to *Copper*: And this *Conversion* is better called, for distinction sake, *Transmutation*.

Experiment Solitary, touching *Concoction* and *Crudity*.

838.

THere are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is *Boyled*, or *Roasted*, or *Fried*, &c. Or when *Bread* and *Meat* are *Baked*, Or when *Cheese* is made of *Curds*, or *Butter* of *Cream*, or *Coles* of *Wood*, or *Bricks* of *Earth*; And a *Number* of others. But to apply *Notions Philosophicall* to *Plebian Terms*; Or to say, where the *Notions* cannot fitly be reconciled that there wanteth a *Term*, or *Nomenclature* for it; (as the *Ancients* used :) They be but *Shifts of Ignorance*: For

Experiment Solitary, touching *Alterations*, which may be called *Majors*.

839

Knowledge

Knowledge will be ever a *wandering* and *Indigested* Thing, if it be but a *Commixture* of a few *Notions*, that are at hand and *occur*, and not excited from sufficient Number of Instances, and those well collated.

The *Consistencies* of *Bodies* are very *Divers*: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, *Not Cleaving*; *Congelable*, *Not Congelable*; *Liquefiable*, *Not Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawne forth in length, *Intractile*; *Porous*, *Solidæ*; *Equall*, and *Smooth*, *Unequall*; *Vinous*, and *Fibrous*, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought* is a *Compendious* and *Inutile Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylva Sylvarum*: Nevertheless in some good part, We shall handle divers of them now presently.

Experiment
Solitary, touch-
ing Bodies
Liquefiable,
and not Lique-
fiable.

840

Liquefiable, and Not Liquefiable, proceed from these Causes: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Turgid* of *Spirit*; Or that have their *Spirits* more *Straitly Imprisoned*; Or again that hold them *Better Pleas'd* and *Content*; Are *Liquefiable*: for these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the last in *Grease*, *Pitch*, *Sulphur*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies* *Jeune* of *Spirits*; Or which part with their *Spirits* more *Willingly*, are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the *Forge*; And a *Stick* bathed in *Hot Ashes*, which thereby becommeth more *Flexible*. Moreover, there are some *Bodies*, which do *Liquefie*, or dissolve by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which dissolve in *Water*; As *Salt*, *Sugar*, &c. The Cause of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The Cause of the latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Again, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those be such *Bodies*, as on the one side have good store of *Spirit*; And on the other side, have the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the latter stimulateth the *Parts* to receive the *Liquor*.

Experiment
Solitary, touch-
ing Bodies
Fragile, and
Tough.

841

OF *Bodies* some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* beak but where the *Force* is: Some shatter and flie in many *Peces*. Of *Fragility* the Cause is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fertile Earth* is more *Fragile* than *Crude Earth*, and *Dry Wood* than *Green*. And the Cause of this *Unaptnesse* to *Extension*, is the *Small Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever *Concomitant* with *Porosity*, and with *Driness* in the *Tangible Parts*: Contrariwise.

Contrariwise, Tough Bodies have more Spirits, and fewer Pores, and Moister Tangible Parts: Therefore we see that Parchment, or Leather will stretch, Paper will not; Wollen Cloth will tenter, Linnen scarcely.

ALL Solide Bodies consist of Parts of two severall Natures; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some Bodies, the *Native Spirit* of the *Bodie*; And in some other, plaine *Aire* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Porés*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Yeelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great *Diversity*; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

THE Concretion of *Bodies* is (commonly) solved by the *Contrary*, As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The Cause is, for that these *Operations* are rather *Returns* to their former *Nature*, than *Alterations*: So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The Cause of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either *Meanes*, exhalet little; For the *Cold* keepeth it in; and the *Heat*, (except it be *Vehement*,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them *Swell*, than *Congeale* them: As when *Ice* is congealed in a *Cup*, the *Ice* will *Swell* in stead of *Contracting*; And sometimes *Rift*.

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Fejunenesse* of the *Spirits*; And their *Imparity* with the *Tangible Parts*: Both which if they be in a greater degree, maketh them not onely *Hard*, but *Fragile*, and lesse *Enduring* of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantity* of *Spirits*; (which ever helpeth to *Induce Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by *Rising* in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulk*, but only giveth *Place*: For you may not think, that in *Printing* of *Wax*, the *Wax* riseth up at all; But only the *depressed Part* giveth place, and the other remaineth as it was. The other that altereth *Bulke* in the *Cession*, as *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a *False Cession*; For it is in *Place*, and not in *Body*,

ALL *Bodies Ductile*, and *Tensile*, (as *Metals*) that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawn into *Yarne*, or *Thred*; have in them the *Appetite* of *Not Discontinuing*, *Strong*; Which maketh them follow the *Force*, that pulleth them out; And yetso, as not *Discontinue* or

R

forfake

Experiment
Solitary, touching the
Two Kinds of
Pneumatics
in Bodies.

842

Experiment
Solitary touching
Concretion, and
Dissolution of
Bodies.

843

Experiment
Solitarie, touching
Hard and Soft
Bodies.

844

Experiment
Solitary, touching
Bodies
Ductile, and
Tensile.

845

for sake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and roape. But the difference between *Bodies Fibrous*, and *Bodies Viscous*, is *Plaine*; For all *Woll*, and *Tow*, and *Cotton*, and *Silke*, (especially raw *Silke*,) have, besides their desire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to joyne and incorporate with other *Thred*; Especially, if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And we see also, that *Gold* and *Silver Thred* cannot be made without *Twisting*.

Experiment
Solitary touch-
ing other
Passions of
Matter, and
Characters of
Bodies.

846

THE Differences of *Impressible*, and *Not Impressible*, *Figurable*, and *Not Figurable*, *Mouldable*, and *Not Mouldable*, *Scissible*, and *Not Scissible*, and many other *Passions* of *Matter*, are *Plebeian Notions*, applied unto the *Instruments* and *Uses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the *Outward Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantity*, or *Great Quantity*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active*, and *Eager*, or *Dull* and *Gentle*. The Seventh is the *Emission* or *Detension* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Unequall*; And again, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Rarity* of the *Tangible Parts*. The Eleventh is the *Equality*, or *Inequality* of the *Tangible Parts*. The Twelfth is the *Disgestion*, or *Crudity* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous*, or *Mercuriall*, *Watry*, or *Oylie*, *Drie*, and *Terrestriall*, or *Moist*, and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length* or *Transverse*; (As it is in the *Warp*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*, &c. The Fifteenth is the *Porosity*, or *Imporosity* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; But these doe occure for the Present.

Experiment
Solitary, touch-
ing Induration
by Sym-
pathy.

847

TAKE *Lead*, and melt it, and in the Middest of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quick-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quick-Silver* will fix, and runne no more, and endure the Hammer. This is a Noble Instance of *Induration*, by *Consent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to ascribe it onely to the *Vapour* of *Lead*, is lesse Probable. Quære whether the *Fixing* may be in such a degree, as it will be *Figured* like other *Metals*? For if so, you may make *Workes* of it for some purposes, so they come not neare the *Fire*.

Sugar

Sugar hath put downe the use of *Honey*; Insomuch as we have lost those *Observations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. First, it seemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* issuing from the *Tree*: Insomuch as one of the *Ancients* relateth, that in *Tribesond*, there was *Honey* issuing from the *Box-Trees*, which made *Men Mad*. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not so Lushious as Ours. They had also a *Wine* of *Honey*, which they made thus. They crushed the *Honey* into a great *Quantity* of *Water*, and then strained the *Liquour*; After they boyled it in a *Copper* to the halfe: Then they powred it into *Earthen Vessels*, for a small time; And after turned it into *Vessels* of *Wood*, and kept it for many yeares. They have also, at this day, in *Russia*, and those *Northerne Countries*, *Mead Simple*, which (well made, and seasoned) is a good wholesome *Drinke*, and very *Cleare*. They use also in *Wales*, a *Compound Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have lost in *Honey*, there were brought in use a *Sugar-Mead*, (for so we may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keep it stale, as they use *Mead*; For certainly, though it would not be so *Abstersive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be used in *Sharp Diseases*: For we see, that the use of *Sugar* in *Beer*, and *Ale*, hath good *Effects* in such Cases.

Experiment
Solitary touching
Honey
and *Sugar*.
848

IT is reported by the *Ancients*, that there was a Kinde of *Steele*, in some places, which would polish almost as white and bright as *Silver*. And that there was in *India* a Kinde of *Brass*, which (being polished) could scarce be discerned from *Gold*. This was in the *Naturall Vre*; but I am doubtfull, whether Men have sufficiently refined *Metals*, which we count *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Height? But when they come to such a *Fineness*, as serveth the ordinary use, they trie no further.

Experiment
Solitary, touching the
Finer Sort of
Base Metals.
849

THere have been found certain *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sun*, harden as Hard as *Marble*: There are also ordinary *Quarries* in *Summerset-Shire*, which in the *Quarry* cut soft to any bignesse, and in the *Building* prove firme, and hard.

Experiment
Solitarie, touching
Cements
and *Quarries*.
850

Living *Creatures* (generally) doe change their *Hair* with *Age*, turning to be *Gray*, and *White*: As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turn *White*; in *Old Squirrels*, that turn *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turn *White*; *Hawkes* from *Brown* turn more *White*; And some *Birds* there be, that upon their *Moulting*, doe turn *Colour*; As *Robin-Red-breasts*, after their *Moulting* grow to be *Red* again by degrees; So doe *Gold-Finches* upon the *Head*. The Cause is, for that *Moisture* doth (chiefly) colour *Hair*, and *Feathers*; And *Drienes* turneth them *Gray* and *White*; Now *Hair* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Hair* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may devise the *Means* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment
Solitary, touching the
Altering of
the *Colour* of
Haires and
Feathers.
851

Experiment
Solitary, tou-
ching the Dif-
ferences of Li-
ving Creatures,
Male and Fe-
male.

852

THe Difference between Male and Female, in some Creatures, is not to be discerned, otherwise than in the Parts of Generation: As in Horses and Mares, Dogs, and Bitches, Doves He and Shee, and others. But some differ in Magnitude, and that diversly; For in most the Male is the greater; As in Man, Pheasants, Peacocks, Turkey's; and the like: And in some few, as in Hawkes, the Female. Some differ in the Haire, and Feathers, both in the Quantity, Crispation, and Colours of them; As Hee-Lions, are Hirsute, and have great Maines; The She's are smooth like Cats. Bulls are more Crispe upon the Fore-Head than Cowes; The Peacock, and Pheasant-Cock, and Gold-Finch-Cock, have glorious and fine Colours; The Hens have not. Generally, the Hees in Birds have the fairest Feathers. Some differ in divers Features; As Bucks have Hornes, Doe's none; Rammes have more Wreathed Hornes than Ewes; Cocks have great Combes and Spurres, Hennes little or none; Boares have great Fangs, Sowes much lesse; The Turkey-Cocke hath great and Swelling Gills, the Henne hath lesse; Men have generally Deeper and Stronger Voices than Women. Some differ in Faculty; As the Cocks amongst Singing Birds, are the best Singers. The Chiefe Cause of all these, (no doubt,) is, for that the Males have more Strength of Heat than the Females; Which appeareth manifestly in this, that all young Creatures Males, are like Females; And so are Eunuchs, and Gelt Creatures of all kindes, liker Females. Now Heat causeth Greatnesse of Growth, generally, where there is Moisture enough to worke upon: But if there be found in any Creature, (which is seene rarely,) an Over-great Heat in proportion to the Moisture, in them the Female is the greater; As in Hawkes, and Sparrowes. And if the Heat be ballanced with the Moisture, then there is no Difference to be seene between Male and Female: As in the Instances of Horses, and Dogs. We see also, that the Hornes of Oxen, and Cowes, for the most part, are Larger than the Bulls; which is caused by abundance of Moisture, which in the Hornes of the Bull faileth. Againe, Heat causeth Pilositie and Crispation; And so likewise Beards in Men. It also expelleth finer Moisture, which want of Heat cannot Expell; And that is the Cause of the Beauty and Variety of Feathers: Againe, Heat doth put forth many Excrescences, and much Solide Matter, which Want of Heat cannot doe: And this is the Cause of Hornes, and of the Greatnesse of them; And of the Greatnesse of the Combs and Spurres of Cocks, Gills of Turkey-Cocks, and Fangs of Boares. Heat also dilateth the Pipes, and Organs, which causeth the Deepness of the Voice. Againe, Heat refineth the Spirits, and that causeth the Cock-Singing Bird, to Excell the Hen.

Experiment
Solitary, tou-
ching the
Comparative
Magnitude of
Living Crea-
tures.

853

THere be Fishes greater then any Beasts; As the Whale is farre greater than the Elephant. And Beasts are (generally) greater than Birds. For Fishes, the Cause may be, that because they Live not in the Aire, they have not their Moisture drawne, and Soaked by the Aire, and Sunne-Beames. Also the rest alwayes in a manner, and are supported by the Water; whereas Motion and Labour do consume. As for the Greatnesse of Beasts, more than of Birds, it is caused, for that Beasts stay Longer time in the Womb, than Birds, and there Nourish, and grow; Whereas in Birds, after the Egge Lay'd, there is no further Growth, or Nourishment from the Female: For the Sitting doth Vivifie, and not Nourish.

Experiment
Solitary tou-
ching Exossa-
tion of Fruits.

854

VVE have partly touched before the Meanes of Producing Fruits, without Coares, or Stones. And this we adde further, that the Cause must be Abundance of Moisture; For that the Coare, and Stone are made of a Drie Sap:

Sap: And we see, that it is possible, to make a *Tree* put forth onely in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stones*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the *Juyce* came onely by the *Barke*, it would worke the *Effect*. For it hath been observed, that in *Pollards*, if the *Water* get in on the *Top*, and they become *Hollow*, they put forth the more. We adde also, that it is delivered for certain by some, that if the *Cions* be grafted, the *Small End* downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Tobacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay, the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same Cause: So that a *Triall* to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a *Decoction*, or *Infusion* of *Indian Tobacco*: But those are but *Sophistications*, and *Toyes*; For Nothing that is once *Perfect*, and hath runne his Race, can receive much Amendment. You must ever resort to the *Beginnings* of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We see some *Leading* of this in *Musk-Melons*; which are sown upon a *Hot Bed*, Dunged below, upon a Bank turned upon the *South Sun*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaseth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them also, which addeth some *Life*: And by these Helps they become as good in *England*, as in *Italy*, or *Provence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of *Roots*, in some such *Liquour*, as may give them *Vigour* to put forth *Strong*.

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea, and the *Heat* of *Vivification* of *Living Creatures*; are both represented and supplied, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set upon the *Backs* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that have been drawn in at the *Window* of a *Kitchen*, have sent forth *Grapes* ripe a *Moneth* (at least) before others. *Stoves*, at the *Backe* of *Wals*, bring forth *Orenge*s here with us. *Egges*, as is reported by some, have been hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* discloseth them.

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *RiZe* ex-
treamly; In so much as a *Quarter* of a *Pint* (unboyled) will arise to a *Pint* boyled. The Cause (no doubt) is, for that the more *Close* and *Compact* the *Body* is, the more it will dilate: Now *Barley* is the most *Hollow*; *Wheat* more *Solide* than that; and *RiZe* most *Solide* of all. It may be also, that some *Bodies* have a *Kinde* of *Lentour*, and more *Depertible Nature* than others; As we see it Evident in *Colouration*, For a *Small Quantity* of *Saffron*, will *Tinct* more, than a very great *Quantity* of *Bresill*, or *Wine*.

Experiment
Solitary tou-
ching the
Melioration of
Tobacco.

855

Experiment
Solitary tou-
ching severall
Heate, work-
ing the same
Effects.

856

Experiment
Solitarie, tou-
ching Swelling
and Dilatation
in Boyling.

857

Experiment
Solitary tou-
ching the
Dulcoration of
Fruits.

858

Fruit groweth Sweet by Rowling, or Pressing them gently with the Hand; As Rowling Peares, Damascins, &c. By Rottenesse; As Medlars, Services, Sloes, Heps, &c. By Time; As Apples, Wardens, Pomegranats, &c. By certaine Speciall Maturations; As by Laying them in Hay, Straw, &c. And by Fire; As in Roasting, Stewing, Baking, &c. The Cause of the Sweetnesse by Rowling, and Pressing, is Emollition, which they properly enduce; As in Beating of Stock-Fish, Flesh, &c. By Rottenesse is, for that the Spirits of the Fruit, by Putrefaction, gather Heat, and thereby digest the Harder Part: For in all Putrefactions, there is a Degree of Heat. By Time and Keeping is, because the Spirits of the Body, doe ever feed upon the Tangible Parts, and attenuate them. By Severall Maturations is, by some Degree of Heat. And by Fire is, because it is the Proper Worke of Heat to Refine, and to Incorporate; And all Sourenesse consisteth in some Grossenesse of the Body: And all Incorporation doth make the Mixture of the Body, more Equall, in all the Parts; Which ever induceth a Milder Taste.

Experiment
Solitary tou-
ching Flesh
Edible, and
not Edible.

859

OF Fleshes, some are Edible; Some, except it be in Famine, not. For those that are not Edible, the Cause is, for that they have (commonly) too much Bitternesse of Taste; And therefore those Creatures, which are Fierce and Cholerick, are not Edible; As Lions, Wolves, Squirrels, Dogs, Foxes, Horses, &c. As for Kine, Sheepe, Goats, Deere, Swine, Conneyes, Hares, &c. We see they are Milde, and Fearfull. Yet it is true, that Horses, which are Beasts of Courage, have beene, and are eaten by some Nations; As the Seythians were called Hippophagi; And the Chinises eat Horse-flesh at this day; And some Gluttons have used to have Colts-flesh baked. In Birds, such as are Carnivore, and Birds of Prey, are commonly no Good Meat; But the Reason is, rather the Cholerick Nature of those Birds, than their Feeding upon Flesh; For Puits, Guls, Shovelers, Ducks, doe feed upon Flesh, and yet are good Meat: And wee see, that those Birds, which are of Prey, or feed upon Flesh, are good Meat, when they are very Young; As Hawkes, Rookes out of the Nest, Owles, &c. Mans Flesh is not Eaten. The Reasons are Three: First, because Men in Humanity doe abhorre it: Secondly, because no Living Creature, that Dyeth of it selfe, is good to Eat: And therefore the Canibals (themselves) eat no Mans Flesh, of those that Die of Themselves, but of such as are Slaine. The Third is, because there must be (generally) some Disparity, between the Nourishment, and the Body Nourished; And they must not be Overneare, or like: yet we see, that in great Weaknesses, and Consumptions, Men have been sustained with Womans Milke: And Picinus fondly, (as I conceive) adviseth, for the Prolongation of Life, that a Veine be opened in the Arme of some wholesome Young Man; And the Bloud to be sucked. It is said, that Witches doe greedily eat Mans Flesh; which if it be true, besides a Devillish Appetite in them, it is likely to proceed, for that Mans Flesh may send up High and Pleasing Vapours, which may stirre the Imagination; And Witches Felicity is chiefly in Imagination, as hath beene said.

Experiment
Solitary tou-
ching the
Salamander.

860

THere is an Ancient Received Tradition of the Salamander, that it liveth in the Fire, and hath force also to extinguish the Fire. It must have two Things; if it be true, to this Operation, The One, a very Close Skin, whereby Flame, which in the Midst is not so hot, cannot enter: For we see that if the Palme of the Hand be annointed thicke with White of Eggs, and then

then *Aquavita*, bee poured upon it, and *Enflamed*, yet one may endure the *Flame* a pretty while. The other is some *Extreme Cold* and *Quenching Vertue*, in the *Body* of that *Creature* which choaketh the *Fire*. We see that *Milke* quencheth *Wild-fire* better than *Water*, because it entreth better.

Time doth change *Fruit*, (as *Apples*, *Pears*, *Pomgranats*, &c. from more *Soure* to more *Sweet*: But contrariwise, *Liquors* (even those that are of the *Juyce* of *Fruit*,) from more *Sweet* to more *Soure*, As *Wort*, *Must*, *New-Verjuice*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both *Kinds*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more mastered by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinks* the *Spirits* doe reign, and finding lesse *Opposition* of the *Parts*, become themselves more *Strong*; Which causeth also more *Strength* in the *Liquor*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquor* becommeth apt to *Burn*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Evapourated*, more *Sourness*.

Experiment Solitary, touching the Contrary Operations of Time, upon Fruits and Liquors. 861

IT hath been observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keep it down from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath only a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause* that *Blows* and *Bruises* induce *Swellings* is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitarie, touching Blows and Bruises. 862

The *Nature* of the *Orris Root*, is almost *Singular*; For there be few *Odoriferous Roots*; And in those that are in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood* or *Leafe*: but the *Orris* is not *Sweet* in the *Leaf*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a *Tender dainty Heat*, which when it commeth above *Ground*, to the *Sun*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

Experiment Solitary, touching the Orris Root. 863

IT hath been observed by the *Ancients*, that a great *Vessel* full, drawn into *Bottles*; And then the *Liquor* put again into the *Vessel*, will not fill the *Vessel* again, so full as it was, but that it may take in more *Liquor*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may bee *Triviall*; Namely, by the *Expence* of the *Liquor*, in regard some may stick to the *Sides* of the *Bottles*: But there may be a *Cause* more *Subtill*; Which is, that the *Liquor* in the *Vessel*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessel*, the *Liquor* meeteth with *Liquor* chiefly; But in the *Bottles* a *Small Quantity* of *Liquor*, meeteth with the *Sides* of the *Bottles*, which *Compress* it so, that it doth not *Open* again.

Experiment Solitary, touching the Compression of Liquors. 864

Water, being contiguous with *Aire*, *Cooleth* it, but *Moisteneth* it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtual Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall *Levitie*, and *Gravity*, as they *Mingle* not, they can follow

Experiment Solitary, touching the Working of Water upon Air Contiguous. 865

no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without *Commixture*: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment
Solitary touch-
ing the
Nature of
Aire.

866

S*Tarre-Light Nights*, yea, and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Driness* and *Fineness* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is drie. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And again, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiments
In Consort,
touching the
Eyes, and
Sight.

867

The *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Nostrill*, the other moveth from the *Nostrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Use* will induce the Contrary: For some can *Squint*, when they will: And the *Common Tradition* is, that if *Children*, be set upon a *Table*, with a *Candle* behinde them, both *Eyes* will move *Outwards*; As affecting to see the *Light*, and so induce *Squinting*.

868

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is *Open*, Dilateth.

869

The *Eyes*, if the *Sight* meet not in one *Angle*, See *Things Double*. The *Cause* is, for that *Seeing* two *Things*, and *Seeing* one *Thing* twice, worketh the same *Effect*: And therefore a little *Pellet*, held between two *Fingers*, laid a crosse, seemeth *Double*.

870

Pore-Blinde Men, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore-Blinde*, are Thinner, and Rarer, than in others; And therefore the *Greater Light* disperseth them. For the same *Cause* they need *Contracting*; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Levell*, the *Sight* is the Stronger: And so is it, when you gather the *Eye-lids* somewhat close: And it is commonly seen in those that are *Pore-Blinde*, that they doe much gather the *Eye-Lids* together. But *Old Men*, when they would see to Read, put the *Paper* somewhat a farre off. The *Cause* is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blind Men*, unite not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Gla-ring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Insomuch as *Perpetuall Looking* against the *Sunne*, would Cause *Blindnesse*. Again, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwise, if they come out of a *Darke Roome*, into a *Light*

Light Roome, they seeme to have a *Mist* before their *Eyes*, and see worse than they shall doe, after they have stayed a little while, either in the *Light*, or in the *Darke*. The *Cause* is, for that the *Spirits Visuall*, are upon a sudden Change, disturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* suddenly; And when they are much *Contracted* by *Darknesse*, they cannot *Dilate* suddenly. And Excesse of both these, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Destroyeth the *Eye*. For as long looking against the *Sunne*, or *Fire* hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumnes*, and *Reading of Small Letters*, doe hurt the *Eye* by *Contraction*.

It hath been observed, that in *Anger*, the *Eyes* wax *Red*; And in *Blushing*, not the *Eyes*, but the *Eares*, and the *Parts* behind them. The *Cause* is, for that in *Anger*, the *Spirits* ascend and wax *Eager*; Which is most easily seen in the *Eyes*, because they are *Translucide*; Though withall it maketh both the *Cheekes* and the *Gills* *Red*; But in *Blushing*, it is true, the *Spirits* ascend likewise to *Succour*, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulled by the *Eyes*, for that the *Eyes*, in *Shame* doe put back the *Spirits*, that ascend to them, as unwillingly to looke abroad: For no *Man*, in that *Passion*, doth looke strongly, but *Dejectedly*; And that *Repulsion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

The *Objects* of the *Sight*, may cause a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath been said. The *Glimpses* and *Beames* of *Diamonds* that strike the *Eye*; *Indian Feathers*, that have glorious *Colours*; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furnished; A *Beautifull Person*; And the like; doe delight and exhilarate the *Spirits* much. The *Reason*, why it holdeth not in the *Offence*, is, for that the *Sight* is most *Spirituall* of the *Senses*; whereby it hath no *Object* *Grosse* enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stincks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activity*. Somewhat they doe *Constristate*, but very little.

Water of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by means of the *Motion*, the *Beames* of light pass not *Straight*, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe *Straight*. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter* than *Glasse Simple*. This *Experiment* deserveth to be driven further, in *Trying* by what *Means Motion* may hinder *Sight*.

Shell-Fish have been, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe *Move*. Neverthelesse it is certain, that *Oysters*, and *Cockles*, and *Muscles*, which move not, have not discriminate *Sex*. *Quare* in what time, and how they are bred? It seemeth that *Shells* of *Oysters* are bred where none

872

873

Experiment
Solitary, touching the
Colour of the
Sea, or other
Water.

874

Experiment
Solitarie, touching Shell-
Fish.

875

none were before; And it is tried, that the great *Horse-Musle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath been tried, that they doe not onely Gape and Shut, as the *Oysters* doe, but Remove from one Place to Another.

Experiment
Solitary, touching the
Right Side
and the Left.
876

THE *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Brain* which is the *Instrument of Sense*, is alike on both *Sides*; But *Motion*, and *Habilities of Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right-Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides* from the Time of our Birth; But the *Limmes* are used most on the *Right Side*, whereby *Custom* helpeth, For we see, that some are *Left Handed*: Which are such as have used the *Left-Hand* most.

Experiment
Solitary touching
Frictions.
877

FRICTIONS make the *Parts* more *Fleshie*, and *Full*: As we see both in *Men*: And in the *Currying of Horses*, &c. The *Cause* is, for that they draw greater *Quantity of Spirits* and *Bloud* to the *Parts*: And again, because they draw the *Aliment* more forcibly from within: And again, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *bloud*, and *Aliment*: Lastly, because they dissipate, and digest any *Inutile* or *Excrementitious Moisture*, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary touching
Globes appearing
Flat at Distance.
878

ALL *Globes* as farre off appeare *Flat*: The *Cause* is, for that *Distance*, being a *Secondary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparity* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engravings*, and *Embossings*, (a farre off) appear *Plain*.

Experiment
Solitary touching
Shadows
879

THE *Uttermost Parts* of *Shadows* seeme ever to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sunne*, doe ever Stirre, though there be no *Wind*; And therefore those *Moving*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to Move, because the *Medium* Moveth.

Experiment
Solitary, touching the
Rowling and
Breaking of
the Seas.
880

SHALLOW, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantity of Water*, and likewise *Space Enough*; there the *Water* Rowleth, and Moveth, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the bottome; there it moveth more *Swiftly*, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment
Solitary, touching the
Dulcoration of
Salt-Water.
881

IT hath beene observed by the *Ancients*, that *Salt-Water Boyled*, or *Boyled* and *Cooled* again, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*.

Fresh. The Cause may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters* of *Worme-wood*, and the like, are not Bitter.

IT hath beene set downe before, that *Pits* upon the *Sea-Shoare*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affricke*, after a time, the *Water* in such *Pits* will become *Brakish* againe. The Cause is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinged with *Salt*. The Remedy therefore is, to digge still *New Pits*, when the old wax *Brackish*; as if you would change your *Strainer*.

Experiment Solitary, touching the Returne of Saltnesse in Pits upon the Sea-Shore.

882

IT hath been observed by the *Ancients*, that *Salt-Water*, will dissolve *Salt* put into it, in lesse time, than *Fresh Water* will dissolve it. The Cause may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, unto it; Whereby it diffuseth in the *Liquor* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more *Quicke* and *Easie Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Unsugred*.

Experiment Solitarie, touching Attraction by Similitude of Substance.

883

Put *Sugar* into *Wine*, part of it above, part under the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* above the *Wine*, will soften and dissolve sooner, than that within the *Wine*. The Cause is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by *Simple Infusion*, or *Spreading*; But that *Part* above the *Wine*, is likewise forced by *Sucking*: For all spungie *Bodies* expell the *Aire*, and draw in *Liquor*, if it be *Contiguous*: As we see it also in *Spunges*, put part above the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by Helpe of *Attraction*.

Experiment Solitary touching Attraction.

884

Water in *Wells* is *Warmer* in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The Cause is, for that in the *Higher Parts*, under the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the *More*; But if it *Perspire*, (as it doth in *Summer*,) it is the lesse.

Experiment Solitary touching Heat under Earth.

885

IT is reported, that amongst the *Leucadians*, in *Ancient* time, upon a *Superstition* they did use to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers* thinne, and close, and in great *Breadth*, will likewise beare up a great *Weight*; Being even laid, without *Tilting* upon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary touching Flying in the Aire.

886

There is, in some *Places*, (namely in *Cephalonia*;) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Upon the *Leaves* whereof there riseth

Experiment Solitary, touching the Dye of Scarlet.

887

seth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to *Quicken*: With this *Dust* they die *Scarlet*.

Exp or
Solitary tou-
ching Malefi-
ciating.

888

IN *Zant*, it is very ordinary, to make *Men Impotent*, to accompany with their *Wives*. The like is Practised in *Gasconie*; Where it is called *Nover l'eguillette*. It is practised alwayes upon the *Wedding Day*. And in *Zant*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no *Light Regard*.

Experiment
Solitary, tou-
ching the
Rise of Water
by Meanes of
Flame.

889

IT is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glas*, because therein you may see the *Motion*,) And set a *Candle* lighted in the *Bottome* of a *Bason* of *Water*; And turne the *Mouth* of the *Pot*, or *Glas*, over the *Candle*, and it will make the *Water* rise. They ascribe it to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little *Ascent* of *Water*, but not much: For the *Flame* Occupying lesse and lesse *Roome*, as it lesseneth, the *Water* succeedeth. But upon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deal of *Water*; For that the *Body* of the *Flame* filleth no more *Place*; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Insomuch as I have seen the *Glas*, being held by the *Hand*, hath lifted up the *Bason*, and all: The *Motion* of *Nexe* did so Clasp the *Bottome* of the *Bason*. That *Experiment*, when the *Bason* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheless this is true, that at the very first *Setting* of the *Mouth* of the *Glas*, upon the *Bottome* of the *Bason*, it draweth up the *Water* a little, and then standeth at a *Stay*, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat*.

Experiments
in Consort,
touching the
Influences of
the Moons.

Of the *Power* of the *Celestial Bodies*, and what more Secret *Influences* they have, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experiments* touching the *Celestial Bodies*: Mean-while, we will give some *Directions* for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moon*; which is our *Nearest Neighbour*.

The *Influences* of the *Moon*, (most observed,) are *Foure*, The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits*.

For

For the *Drawing forth* of Heat, we have formerly prescribed to take *Water Warme*, and to set Part of it against the *Moone Beames*, and Part of it with a *skreene* betweene; And to see whether that which standeth *Exposed* to the *Beames*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sunne* we see a *Small Shade* doth much,) it were good to trie it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warme* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

890

For the *Inducing* of *Putrefaction*, it were good to trie it with *Flesh*, or *Fish*, *Exposed* to the *Moone-Beames*; And againe *Exposed* to the *Aire*, when the *Moone* shineth not for the like time; To see whether will corrupt sooner: And trie it also with *Capon*, or some other *Fowle* laid abroad to see whether it will mortifie, and become tender sooner? Trie it also with *Dead Flies*, or dead *Wormes*, having a little *Water* cast upon them, to see whether will *Putrefie* sooner. Trie it also with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to see whether will *Rot* or *Mould* sooner? Trie it also with *Holland Cheese*, having *Vine* put into it, whether will breed *Mites* sooner or greater?

891

For the *Increase* of *Moisture*, the Opinion Received is; That *Seeds* will grow soonest; And *Haire*, and *Nails*, and *Hedges*, and *Herbs*, *Cut*, &c. Will grow soonest; if they be *Set*, or *Cut*, in the *Increase* of the *Moone*. Also that *Braines* in *Rabits*, *VWood-Cocks*, *Calves*, &c. are fullest in the *Full* of the *Moone*: and so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you have them in *pits*:

892

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) And set some of them immediately after the *Change*; and others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth*, also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what *Time*, the *Seeds Set* in the *Increase* of the *Moone*, come to a certaine *Height*; And how they differ from those that are *Set* in the *Decrease* of the *Moone*.

893

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for those that have *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloes*, *Rose-Mary*, *Frankincense*, &c. about the *Full* of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, *Increase*, and *Decrease*, as the *Moone* doth; And therefore it were good to *Purge*, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

894

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

895

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are not yet brought into *Observation*. It may be, that if it so fall out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-VVest*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed.

896

It may be, that *Children*, and *Young Cattell*, that are Brought forth in the *Full* of the *Moone*, are stronger, and larger then those that are brought forth in the *VVane*: And those also which are Begotten in the *Full* of the *Moone*; So that it might be good *Husbandrie*, to put *Rammes*, and *Bulls* to their

897

Females, somewhat before the *Full* of the *Moone*. It may be also, that the *Egges* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quere* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*.

Experiment
Solitary, touch-
ing *Vinegar*
898

THe *Turning* of *Wine* to *Vinegar*, is a Kind of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Oylie Spirits*, and leaveth the *Liquor* more *Soure*, and *Hard*. We see also, that *Burnt Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuice* over against the *Sunne*, in *Summer*, as they do *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary, touch-
ing *Crea-
tures* that
Sleep all
Winter.
899

THere be divers *Creatures*, that *Sleepe* all *Winter*; As the *Beare* the *Hedge-hog*, the *Bat*, the *Bee*, &c. these all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoever *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping-Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *VVarme* and *Clofe Places* to *Sleep* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the *Middle* of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Bear*, *Big* with *Young*, hath seldome beene seene.

Experiment
Solitary touch-
ing the
Generation of
Creatures by
Copulating,
and by *Putre-
faction*.
900

SOME *Living Creatures* are procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many do (neverthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vivification* is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *swelling* into *Shape*, and *Members*. Therefore all *Sperme*, al *Menstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Clofenesse*, *Lentour*, and *Sequacitie*. It seemeth therefore, that the *Generation* by *Sperme* onely, and by *Putrefaction*, have two *Different Causes*. The first is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as those have which are Procreated by *Copulation*), cannot be produced by a *VVeake*, and *Casvall Heat*; Nor out of *Matter*, which is not *Exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be inclosed in a *Place* where it may have *Continuance* of the *Heat*, *Accesse* of some *Nourishment* to maintaine it, and *Clofenesse* that may keepe it from *Exhaling*. And such

Places

Places, or the Wombs, and Matrices, of the Females. And therefore all Creatures, made of Putrefaction, are of more Vncertaine Shape; And are made in Shorter Time; And need not so Perfect an Enclosure, though some Closenesse be commonly required. As for the Heathen Opinion, which was, that upon great Mutations of the World, Perfect Creatures were first Engendred of Concretion; As well as Frogs, and Wormes, and Flies, and suchlike, are now; We know it to be vaine: But if any such Thing should be admitted, Discourfing according to Sense, it cannot be, except you admit of a Chaos first, and Commixture of Heaven and Earth: For the Frame of the World once in Order, cannot effect it by any Excesse or Casualty.

NATV-



NATVRALL HISTORIE.

X. Century.

THe Philosophie of Pythagoras, (which was full of Superstition,) did first plant a Monstrous Imagination, which afterwards was, by the Schoole of Plato, and Others, Watred, and Nourished. It was, That the *World* was *One*, Entire, Perfect, Living Creature; Inſomuch as Apollonius of Tyana, a Pythagorean Prophet, affirmed, that the Ebbing and Flowing of the Sea, was the Respiration of the World, drawing in Water as Breath, and putting it forth againe. They went on, and inferred; That if the *World* were a Living Creature, it had a Soule, and Spirit; Which also they held, calling it *Spiritus Mundi*; The Spirit or Soule of the *World*: By which they did not intend God; (for they did admit of a Deity besides:) But onely the Soule, or Essentiall Forme of the *Vniuerſe*. This Foundation being laid, they mought build upon it, what they would; For in a Living Creature, though never so great, (As for example, in a great Whale,) the Sense, and the Affects of any one Part of the Body, instantly make a Transcursion thorow-out the whole Body: So that by this they did insinuate, that no distance. of Place, nor Want or Indisposition of Matter, could hinder Magicall Operations; But that (for example, we mought here in Europe, have Sense and Feeling of that, which was done

Experiments
in Conſort,
touching
Transmission
and Influx, of
Immaterialle
Vertues, and
the Force of
Imagination.

in China : And likewise, we mought worke any *Effect*, without and against *Matter* : And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but onely by the *Vnitie* and *Harmony* of *Nature*. There were some also, that staid not here ; but went further, and held ; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe give a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature* ; For *Paracelsus* and some darksome *Authors*, of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these *Vast* and *Bottomlesse Follies*, *Men* have beene (in part) entertained.

But wee, that hold firme to the *Works* of *God* ; And to the *Sense*, which is *Gods Lamp* ; (*Lucerna Dei Spiraculum Hominis* ;) will enquire, with all *Sobrietie*, and *Severity*, whether there be to be found, in the *Foot-steps* of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues* ; And what the *Force* of *Imagination* is ; Either upon the *Body Imaginant*, or upon another *Body* : Wherein it will be like that *Labour* of *Hercules*, in *Purging* the *Stable* of *Angeas*, to separate from *Superstitions*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall* ; And not to be either *Contemned*, or *Condemned*. And although we shall have occasion to speake of this in more *Places* than *One*, yet we will now make some *Entrance* thereinto.

Experiments
in Confort,
Monitorie,
touching
Transmission of
Spirits, and
the Force of
Imagination.

901

MEn are to be Admonished, that they do not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects* faile sometimes. For as in *Infection*, and *Contagion*, from *Body* to *Body*, (as the *Plague*, and the like,) it is most cerain, that the *Infection* is received (many times) by the *Body passive*, but yet is by the *Strength*, and good *Disposition* thereof, *Repulsed*, and wrought out, before it be formed in a *Disease* ; So much more in *Impressions* from *Mind* to *Mind*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is *Encountred*, and *Overcome*, by the *Mind* and *Spirit*, which is *Passive*, before it work any manifest *Effect*. And therefore they work most upon *Weake Mindes*, and *Spirits* : As those of *Women*, *Sicke Persons* ; *Superstitious* and *Fearfull Persons* ; *Children* and *Young Creatures* :

Nescio quis teneros oculus mihi fascinat Agnos :

The *Poet* speaketh not of *Sheep*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, upon *Kings*, and *Magistrates* ; It may be ascribed (besides the main, which is the *Protection* of *God*, over those that *Execute* his *Place*,) to the *Weaknesse* of the *Imagination* of the *Imaginant* : For it is hard for a *Witch*, or a *Sorcerer*, to put on a *Beliefe*, that they can hurt such *Persons*.

902

Men are to be admonished, on the other side, that they doe not easily give *Place* and *Credit* to these *operations*, because they *Succeed* many times.

For

For the Cause of this *Succeſſe*, is (oft) to be truly aſcribed, unto the Force of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondary Meanes*, it may work upon a *Divers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or ſome Part of a *Beaſt*, beleeving ſtrongly, that it will help him to obtain his *Love*; Or to keep him from danger of hurt in *Fight*; or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Induſtrious*; And again, more *Confident*, and *Perſiſting*, then otherwiſe he would be. Now the great *Effects* that may come of *Induſtry*, and *Perſeverance*, (eſpecially in *Civill Buſineſſe*,) who knoweth not? For we ſee *Audacity* doth almoſt bind and mate the *Weaker Sort* of *Mindes*; And the *ſate* of *Humane Actions* is ſo variable, that to try things oft, and never to give over, doth Wonders: Therefore it were a *Meere Fallacy* and *Miſtaking*, to aſcribe that to the Force of *Imagination*, upon another *Body*, which is but the Force of *Imagination* upon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, work greatly upon the *Body* of the *Imaginant*: As we ſhall ſhew in due place

Men are to be Admoniſhed, that as they are not to miſtake the *Causes* of theſe *Operations*; So, much leſſe, they are to miſtake the *Fact*, or *Effect*; And raſhly to take that for done, which is not done. And therefore, as divers wiſe *Judges* have preſcribed, and cautioned, Men may not too raſhly beleve, the *Confefſion* of *Witches*, nor yet the *Evidence* againſt them. For the *Witches* themſelves are *Imaginative*, and beleve oft-times, they doe that, which they do not: And *People* are *credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-craft*. It is worthy the Obſerving, that both in *Ancient*, and *Late times*; (As in the *Theſſalian Witches*, and the *Meetings* of *Witches* that have been recorded by ſo many late *Confefſions*;) the great Wonders which they tell, of *Carrying* in the *Aire*; *Transforming* themſelves into other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantation* or *Ceremonies*; but by *Ointments*, and *Annointing* themſelves all over. This may juſtly move a *Man* to think, that theſe *Fables* are the *Effects* of *Imagination*: For it is certain, that *Ointments* do all, (if they be laid on any thing thick,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the *Particular Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Neck*, *Feet*, *Back-Bone*, we know is uſed for *Procuring Dead Sleeps*: And if any *Man* ſay, that this *Effect* would be better done by *Inward Potions*; Answer may be made, that the *Medicines*, which go to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they worke Potently, though Outwards.

We will divide the Severall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will give no ſmall Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* have this; That they Worke at *Distance*, and not at *Touch*; And they are theſe being diſtinguiſhed.

The Firſt is the *Transmission* or *Emission*, of the *Thinner* and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeal*. But you muſt remember withal, that there be a number of theſe *Emissions*, both *Unwholeſome*, and *Wholeſome*, that give no *Smell* at all: For

For the *Plague*, many times when it is taken, giveth no *Sent* at all : And there be many *Good* and *Healthful Aires*, that do appeare by *Habitation*, and other *Proofes*, that differ not in *Smell* from other *Aires*. And under this *Head*, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour-like*; Whereof some neverthelesse are strange, and very suddenly diffused; as the *Alteration* which the *Aire* receiveth in *Egypt*, almost immediately, upon the *Rising* of the *River* of *Nilus*, whereof we have spoken.

905 The Second is, the *Transmission* or *Emission* of those *Things* that we call *Spiritnall Species*; As *Visibles*, and *Sounds*: The one whereof we have handled ; and the other we shall handle in due place. These move swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

906 The third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Loadstone* be commonly placed in the *First Rank*, yet we think good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And divers others; Wee shall handle, but yet not under this present *Title*, but under the *Title* of *Attraction* in generall.

907 The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those *Things* which worke by the *Vniversall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxies*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kind is, (as we yet suppose,) the *Working* of the *Loadstone*, which is by *Consent* with the *Globe* of the *Earth*: Of this kinde is the *Motion* of *Gravitie*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kind is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kind we conceive the *Maine Float* and *Refloat* of the *Sea* is, which is by *Consent* of the *Vniverse*, as *Part* of the *Diurnal Motion*. These *Immateriate Vertues* have this *Property* differing from others; That the *Diversity* of the *Medium* hindereth them not; But they passe through all *Mediums*; yet at *Determinate Distances*. And of these we shall speake, as they are incident to severall *Titles*.

908 The Fifth is, the *Emissions* of *Spirits*; And this is the Principall in our *Intention* to handle now in this *Place*: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together; For when an *Envious*, or *Amorous Aspect*, doth infect the *Spirits* of *Another*, there is *Joyned* both *Affection*, and *Imagination*.

909 The Sixth is, the *Influxes* of the *Heavenly Bodies*, besides those two *Manifest Ones*, of *Heat*, and *Light*, But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you desire to *Super-induce*, any *Vertue* or *Disposition*, upon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent* and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Again, you must take the *Parts*, in the *Time*, and *Act* when that *Vertue* is most in *Exercise*; And then you must apply it to that,

Part of Man, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cocke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cock* have been in *Fight*; And let them be worn, upon a *Mans-Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speak under this present *Title*.

The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly avouched by many: And we have set it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, until there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individual*: That is, that in *Things*, or the *Parts* of *Things* that have been once *Contiguous*, or *Entire*, there should remain a *Transmission* of *Vertue* from the one to the other: As between the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Vnguentum Teli*: And so of a *Peece* of *Lard*, or *Stick* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now we will pursue the *Instances* themselves.

THe *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a *Sent*, of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells* of *Flowers* that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White-Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either *Inward*, (as *Mithridate*, *Juniper-Berries*, *Rue*, *Leafe*, and *Seed*, &c.) Or *Outward*, (as *Angelica*, *Zedoary*, and the like, in the *Mouth*; *Tarre*, *Galbanum*, and the like, in *Perfume*;) Nor againe by *Old People*, and such as are of a *Drie* and *cold complexion*. On the other side, the *Plague* taketh soonest hold of those that come out of a *Fresh Ayre*; and of those that are *Fasting*; and of *children*; And it is likewise noted to goe in a *Bloud*, more then to a *Stranger*.

The most pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*, When *Prisoners* have been Long, and Close, and Nastily kept; Whereof we have had, in our time, experience, twice or thrice; when both the *Judges* that sate upon the *Iayle*, and *Numbers* of those that attended the *Businesse*, or were present, *Sickned* upon it, & *died*. Therefore it were good wisdom, that in such Cases, the *Iayle* were *Aired*, before they be brought forth.

Out of question, if such *Foule Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*: For they are not those *Stinks*, which the *Nostrils* straight abhor, and expell, that are most *Pernicious*; But such *Aires*, as have some similitude with *Mans body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in using such *Compositions*, in great Meetings of *People*, within *Houses*; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath been used by the *Turks* in the *Warres*; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Countrey* to the *Holy Land*. And these *Empoysonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the

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Experiments
in Consort
touching
Emission of
Spirits in *Va-*
por, or *Ex-*
halation,
Odour-like.

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the *Infection*: And therefore, when any such thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoysonment* of Particular Persons, by *Odours*, hath been reported to be in *Perfumed Gloves*, or the like. And it is like, they mingle the *Poyson* that is deadly, with some *Smells* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annointings* of the *Chincks* of *Doores*, and the like; Not so much by *Touch*, as for that it is common for *Men*, when they finde any thing Wet upon their *Fingers*, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires* cannot be made without *Dangers* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselves; So that *Men* ought not to be secure of it.

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There have been, in divers *Countries*, great *Plagues* by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon *Heaps*.

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It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other *Workes* about *Metals*, and *Minerals*, have their *Braines* Hurt and *Stupefied* by the *Metalline Vapours*. Amongst which it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; Insomuch as *Gilders* use to have a *Peece* of *Gold* in their *Mouth*, to draw the *Spirits* of *Quick-silver*; Which *Gold* afterwards they finde to be *Whitened*. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them.

919

The *Vapour* of *Char-coale*, or *Sea-coale*, in a *Close Roome*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little and little; Enducing onely *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-coale* they had, wherewith (at first) they were much refreshed; But a little after they had sat about the *Fire*, there grew a generall *Silence* and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a *Swoone*; Whereupon they doubting what it was, opened their *d'oor*, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Where of no lesse *Man* than the *Emperour Iovinianus* Died.

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Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire* upon the *First Showres*, after long *Drought*.

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It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely.

922

It hath been a practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*.

923

It is an *Antient Tradition*, that *Bleare-Eyes* infect *Sound Eyes*; And that a *Menstruous Woman*, looking in a *Glasse*, doth rust it. Nay they have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, do *Corne* and *Herbs* good by *Killing* the *Wormes*.

924

The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that

that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

Perfumes Convenient doe dry and strengthen the *Brain*; And stay *Rheumes*, and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dried, and *Lignum Aloes*, and *Calamus* taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinkled with a little *Rose-Water*, &c.

They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vineger*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away.

Tobacco comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh, partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish *Triall* be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum-Aloes*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

The *Following* of the *Plough*, hath been approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; because the *Earth* hath spent her sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it when you sow *Barley*. But because *ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may do themselves much good by *kneeling* upon a *Cushion*, and *Weeding*. And these things you may practice in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest* *Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* bee too *Moist*. I knew a great *Man*, that lived *Long*, who had a *Clean Clod* of *Earth*, brought to him every *Morning*, as he fate in his *Bed*; And he would hold his *Head* over it, a good pretty while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleep*, &c. For though those things be not so strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at *Times*; And besides, there be divers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*, *Amomum*; &c.

There be two *Things*, which (inwardly used) doe *Coole* and *condense* the *Spirits*; And I wish the same to be tried outwardly in *Vapours*. The One is *Nitre*, Which I would have dissolved in *Malmesey*, or *Greeke-Wine*, and so the *Smell* of the *Wine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they do *Rose-Water* and *Vineger*. The Other is the *Distilled Water* of *Wilde Poppey*; which I wish to bee mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*.

931 Smells of Muske, and Amber, and Civit, are thought to further *Venerous Appetite* : which they may doe by the *Refreshing* and *calling forth* of the *Spirits*.

932 Incense, and Nidorous Smells, (such as were of Sacrifices,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Devotion* : Which they may doe by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. We see that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common Uses*.

933 There be some *Perfumes*, prescribed by the *VVriters* of *Naturall Magicke*, which procure *Pleasant Dreames* ; And some others (as they say,) that procure *Propheticall Dreames* ; as the *Seeds* of *Flax*, *Flea-wort*, &c.

934 It is certaine that *Odours* doe, in a small Degree, *Nourish* ; Especially the *Odour* of *VVine* : And we see *Men* an hungred, doe love to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *VVoman*, in the *House*, complaine, that she should be kept from being at a *Feast*, and *Solemunity*, (which she much desired to see,) because there would be a *Corps* in the *House* ; Whereupon he caused *Loaves* of *New Bread* to be sent for and opened them ; And powred a little *VVine* into them ; And so kept himselfe alive with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke* ; But the same *Man* used to have continually, a great *VVisp* of *Herbs*, that he smelled on : And amongst those *Herbe*, some *Esculent* *Herbs* of strong *Sent* ; As *Onions*, *Garlicke*, *Leekes* and the like.

935 They do use, for the *Accident*, of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour* : And by those *Ill Smells*, the *Rising* of the *Mother* is put downe.

936 There be *Aires*, which the *Physitians* advise their *Patients* to remove unto, in *Consumptions*, or upon *Recovery* of *Long Sicknesse* : VVhich (commonly are *Plaine Champaignes*, but *Grafsing*, and not *Over-growne* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groves* of *Bayes* doe forbid *Pestilent Aires* ; VVhich was accounted a great *Cause* of the *VVholesome Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselves ; As *Wilde Thyme* ; *Wilde Marjoram* ; *Penney-Royall* ; *Camomill* ; And in which the *Briar-Roses* smell almost like *Muske-Roses* ; VVhich (no doubt) are *Signes* that do discover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses* ; VVhich will never be, if the *Roomes* be *Low-Roofed*, or full of *VVindowes*, and *Doores* ; For the one maketh the *Aire Close*, and not *Fresh* ; And the other maketh it *Exceeding Vnequall* ; VVhich is a great *Enemy* to *Health*. The *VVindowes* also should not be high up to the *Roofe*, (which is in use for *Beautie*, and *Magnificence*,) but *Low*. Also *Stone-Walls* are not *wholesome* ; But *Timber* is more *wholesome*, And especially *Brick*, Nay it hath beene used by some, with great *Successe*, to make their *Walls* thick ; And to put a *Lay* of *Chalke* between the *Bricks*, to take away all *Dampishnesse*.

Experiment
Solitary, touching the
Emissions of
Spiritual Spe-
ies which
effect the
Anses.
se 938

THESE *Emissions* (as we said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles* : That is, *Visibles*, and *Audibles*, each a-part : In this Place, it shall suffice to give some generall *Observations*, *Common* to both. First, they seeme to be *Incorporeall*. Secondly, they *VVork* *swiftly*. Thirdly, they *VVorke* at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing* ; Nor leave no
VVorke

Work behind them; But are *Energies* meerely; For their *Working* upon *Mirrors*, and *Places* of *Eccho*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarifying* the *Aire* by *Great Noises*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spirit* of *Living Creatures*.

It is mentioned in some *Stories*, that where *Children* have been *Exposed*, or taken away young from their *Parents*; And that afterward they have approached to their *Parents* presence, the *Parents*, (though they have not known them,) have had a *Secret Joy*, or Other *Alteration* thereupon.

There was an *Aegyptian South-Sayer*, that made *Anthoni* beleieve, that his *Genius*, (which otherwise was *Brave*, and *Confident*.) was, in the Presence of *Octavianus Caesar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove farre from him. The *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Aegypt*, and other *Remote Places* from *Rome*. Howsoever the *Conceit* of a *Predominante* or *Mastering Spirit* of one *Man* over Another, is *Ancient*, and Received still, even in *Vulgar Opinion*.

There are *Conceits*, that some *Men*, that are of an *Ill*, and *Malancholy Nature*, do incline the *Company*, into which they come, to be *Sad* and *Ill disposed*; And contrariwise, that Others, that are of a *Ioviall Nature*, doe dispose the *Company* to be *Merry* and *Cheerful*. And again, that some *Men* are *Luckie* to be kept *Company* with, and *Employed*; And others *Unluckie*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in Presence one with another, as well as from *Body* to *Body*.

It hath been observed, that *Old Men* who have loved *Young Company*, and been *Conversant* continually with them; have beene of *Long Life*; Their *Spirits*, (as it seemeth,) being *Recreated* by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which ever had *Young Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who lived til they were an *Hundred yeares Old*. And so likewise did many of the *Grammarians*, and *Schoole-Masters*; such as was *Orbilius*, &c.

Audacity and *Confidence* doth, in *Civill Businesse*, so great *Effects*, as a *Man* may (reasonably) doubt, that besides the very *Daring* and *Earnestnesse*, and *Perfisting*, and *Importunity*, there should be some *Secret Binding*, and *Stooping* of other *Mens Spirits*, to such *Persons*.

The *Affections* (no doubt) do make the *Spirits* more *Powerful*, and *Active*. And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Love*, and *Envy*, which is called *Oculus Malus*. As for *Love*, the *Platonists*, (some of them,) go so farre as to hold that the *Spirit* of the *Lover*, doth passe into the *Spirits* of the *Person Loved*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Apetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is observed likewise, that the *Aspects* that procure *Love*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envy*, that emiteth some *Maligne* and *Poysonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewise of greatest *Force*, when the *Cast* of the *Eye* is *Oblique*. It hath been noted also, that it is most *Dangerous*, where the

Experiments
in Consort
touching
Emission or
Immaterial
Vertues from
the Mindes,
and Spirits of
Men, either
by Affections,
or by Imagi-
nations, or by
other Impres-
sions.

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Envious Eye is cast upon *Persons* in *Glory*, and *Triumph*, and *Joy*. The Reason whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at Hand: And therefore it hath been noted, that after great *Triumphs*, Men have been ill disposed, for some *Dayes* following; We see the *Opinion* of *Fascination* is *Ancient*; for both *Effects*; Of *Procuring Love*; And *Sicknesse* caused by *Envie*: And *Fascination* is ever by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most *Forcibly* by the *Eye*.

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Fear, and *Shame*, are likewise *Infective*; For we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now we will speake of the *Force* of *Imagination* upon other *Bodies*; and of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I understand to bee, the *Representation* of an *Individuall Thought*. *Imagination* is of three *Kind*es: The First *Joy*ned with *Belee*fe of that which is to *Come*: The Second *Joy*ned with *Memorie* of that which is *Past*; And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imagination Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to bee in the *Vestments* of a *Pope*; Or to have *Wings*. I single out, for this time, that Which is with *Faith*, or *Belee*fe of that which is to *Come*. The *Inquisition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; For the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with *Extreme Caution*; For the Reason which wee will after declare.

The *Power* of *Imagination* is in three *Kind*es; The First, upon the *Body* of the *Imaginant*; Including likewise the *Child* in the *Mother's Womb*; the Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man* *Constantly* and *Strongly Belee*ving, that such a *Thing* shall be; (As that such an *One* will *Love Him*; Or that such an *One* will *Grant Him* his *Request*; Or that such an *One* shall *Recover* a *Sicknesse*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath been partly said before,) that it should help by *Making* a *Man* *More Stout*, or more *Industrious*; (in which kinde *Constant Belee*fe doth much;) But meerely by a *Secret Operation*,

ration, or Binding, or Changing the Spirit of Another : And in this it is hard (as we began to say,) to make any New Experiment ; For I cannot command my Selfe to Beleeve what I will, and so no Triall can be made. Nay it is worse ; For whatsoever a Man Imagineth doubtingly, or with Feare, must needs doe hurt, if Imagination have any Power at all ; For a Man representeth that oftner, that he feareth, than the contrary.

The helpe therefore is, for a Man to worke by Another, in whom he may Create Beleeve, and not by Himselfe ; untill Himselfe have found by Experience, that Imagination doth prevaile ; For then Experience worketh in Himselfe Beleeve ; if the Beleeve, that such a Thing shall be, be joyued with a Beleeve that his Imagination may procure it.

For example, I related one time to a Man, that was Curious, and Vaine enough in these Things; That I saw a kind of Jugler, that had a Paire of Cards, and would tel a Man what Card he thought. This Pretended learned Man told me ; It was a mistaking in mee, For (said he) it was not the Knowledge of the Mans Thought (for that is Proper to God,) but it was the Inforcing of a Thought upon him, and Binding his Imagination by a Stronger, that he could Think no other Card. And thereupon he asked me a Question, or two, which I thought he did but cunningly, knowing before what used to be the Feats of the Jugler. Sir, (said he) doe you remember whether he told the Card, the Man thought, Himselfe, or bade Another to tel it? I answered (as was true;) That he bade Another tell it. Whereunto he said; So I thought : For (said he) Himselfe could not have put on so strong an Imagination; But by telling the other the Card, (who beleeved that the Jugler was some Strange Man, and could do Strange Things) that other Man caught a strong Imagination. I hearkened unto him, thinking for a Vanity he spok prettily. Then he asked me another question; Saith he; Do you remember, whether he bade the Man think the Card first, and afterwards told the other Man in his Eare, what he should think ; Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a Man should thinke such a Card, and after bade the Man thinke a Card ? I told him, as was true; That he did first whisper the Man in the Ear, that such a Man should thinke such a Card : upon this the Learned Man did much exult, and Please himselfe, saying ; Lee, you may see that my Opinion is right : For if the Man had thought first, his Though had been fixed : But the other Imagining first, bound his Thought. Which thought it did somewhat sinke with me, yet I made it Lighter than I thought, and said ; I thought it was Confederacy, between the Jugler, and the two Servants : Though (indeed) I had no Reason so to thinke: For they were both my Fathers servants; And he had never plaid in the House before. The Jugler also did cause a Garter to be held up ; And tooke upon him, to know, that such an One, should point in such a Place, of the Garter ; As it should be neare so many Inches to the Longer end, and so many to the Shorter ; And still he did it, by First Telling the Imaginer, and after Bidding the Afour Thinke.

Having told this Relation, not for the Weight thereof, but because it doth handsomely open the Nature of the Question ; I

returne to that I said ; That *Experiments* of *Imagination*, must be practised by others, and not by a *Mans* Selfe. For there bee Three *Meanes* to fortifie *Beleeve* : The first is *Experience* : The Second is *Reason* : And the Third is *Authoritie* : And that of these, which is farre the most *Potent*, is *Authoritie* : For *Beleeve* upon *Reason*, or *Experience*, will Stagger.

947

For *Authority*, it is of two Kinds ; *Beleeve* in an *Art* ; And *Beleeve* in a *Man*. And for Things of *Beleeve* in an *Art* ; A *Man* may exercise them by *Himselfe* ; But for *Beleeve* in a *Man*, it must be by *Another*. Therefore if a *Man* beleeve in *Astrologie*, and finde a *Figure* Prosperous ; Or beleeve in *Natural Magick*, and that a *Ring* with such a *Stone*, or such a *Peece* of a *Living Creature*, Carried, will do good ; It may help his *Imagination* : But the *Beleeve* in a *Man* is farre the more *Active*. But howsoever, all *Authority* must be out of a *Mans* Selfe, turned (as was said,) either upon an *Art*, or upon a *Man* : and where *Authority* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Full* of *Thoughts* ; And such are (for the most part,) all *Witches*, and *Superstitious Persons* ; Whose *Beleeves*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience* : And upon the same Reason, in *Magick*, they use (for the most part,) *Boyes*, and *Young People* ; whose *Spirits* easiliest take *Beleeve*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes : The *Authoritie* whence the *Beleeve* is derived ; *Meanes* to *Quicken* and *Corroborate* the *Imagination* ; And *Meanes* to repent it, and *Refresh* it.

948

For the *Authoritie*, we have already spoken : As for the Second ; Namely the *Meanes* to *Quicken* & *Corroborate* the *Imagination* ; Wee see what hath been used in *Magick* ; (If there be in those Practises any thing that is purely *Naturall* ;) As *Vestments* ; *Characters* ; *Words* ; *Seales* ; Some parts of *Plants*, or *Living Creatures* ; *Stones* ; *Choice* of the *Houre* ; *Gestures* and *Motions* ; Also *Incenses*, and *Odours* ; *Choice* of *Societie*, which increaseth *Imagination* ; *Diets* and *Preparations* for some time before. And for *Words*, there have been ever used, either *Barbarous Words* of no Sense, lest they should disturb the *Imagination* ; Or *Words* of *Similitude*, that may second and feed the *Imagination* : And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are used also *Scripture-Words* ; For that the *Beleeve*, that *Religious Texts* and *Words* have Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst us is counted the *Holy Tongue*, and the *Words* more *Mysticall*,) are often used.

949

For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it ;) We see the practices of *Magick*, as in *Images* of *Wax*, and the like, that should Melt by little, and little ; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little ; Or the like : For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

950

If there be any Power in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate* a *Vertue*, as to worke at great *Distances* ; Or though all *Mediums* ; Or upon all *Bodies* : But that the *Distance* must be competent ; The *Medium* not *Adverse* ; And the *Body* Apt and Proportionate. Therefore if there be any Operation upon *Bodies*, in Absence by Nature :

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it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any a farre off, it cannot bee naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that party upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; and so by *Him* to the *Partie intended himselfe*. And although they speake that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse Credit to be given to those Things, except it be by Working of evill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power of Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare *Proofes*; For that they may bee, by a *Tacite Operation* of *Maligne Spirits*: Wee shall therefore be forced in this *Enquirie*, to resort to New *Experiments*: Wherein we can give onely *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as we do Commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as wee shall trie them at leisure: But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man of Art*, as they call it; For else the Simple *Affirmation* to *Another*, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more then another, that you did use the *Imagination* of more then *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Servants*, that their *Master* shall surely recover.

The *Imagination* of *One*, that you shall use, (such is the Varietie of *Mens Mindes*) cannot be alwayes alike *Constant*, and *Strong*; And if the *Successe* follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you use, severall degrees of *Means* by which to *Operate*; As to prescribe him, that every Three Dayes, if hee finde not the *Successe* Apparent, he do use another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, *Another*; And if that, *Another*, till Seven Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sicke-man*, that his *Master* shall recover, but it will be Fourteene dayes, ere he findeth it apparently, &c. All this to entertain the *Imagination*, that it waver lesse.

It is certain, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nostrils*; And *Oyntments* of some *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you use, if you prescribe him, before he doe use the *Receit*, for the *Worke* which he desireth, that he doe take such a *Pill* or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles*, of his *Feet*, with such an *Ointment*,

ment or Oyle : And you must chuse, for the *Composition* of such Pill, *Perfume*, or *Oyntment*, such *Ingredients* as doe make the *Spirits* a little more *Grosse*, or *muddy* ; Whereby the *Imagination* will fix the better.

955 The *Body Passive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*) is better wrought upon, (as hath been partly touched) at some *Times*, than at others: as if you should prescribe a *Servant*, about a *Sicke Person*, (whom you have possessed, that his *Master* shall recover,) when his *Master* is fast asleepe, to use such a *Root*, or such a *Root*. For *Imagination* is like to work better upon *Sleeping Men*, than *Men Awake* ; As we shall shew when we handle *Dreames*.

956 We finde in the *Art of Memory*, that *Images Visible*, worke better than other *Conceits* : As if you would remember the Word *Philosophy*, you shall more surely do it, by *Imagining*, that such a *Man*, (For *Men* are best *Places*) is reading upon *Aristotles Physicks* ; than if you should *Imagin* him to say ; *I'll goe study Philosophy*. And therefore, this *Observation* would be translated to the *Subject* we now speak of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you shall, in that *Experiment*, (whereof we spake before,) of *Binding of Thoughts*, lesse faile, if you tell One, that such an One shall name one of *Twenty Men*, than if it were One of *Twenty Cards*. The *Experiment* of *Binding of Thoughts*, would be *Diversified*, and tried to the Full : And you are to note, whether it hit for the most part, though not alwayes.

957 It is good to consider, upon what *Things*, *Imagination* hath most Force: And the *Rule*, (as I conceive,) is, that it hath most Force upon *Things*, that have the *Lightest*, and *Easiest Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon such *Affections*, as move *Lightest* ; As upon *Procuring of Love*; *Binding of Lust*, which is ever with *Imagination*, upon *Men in Feare* ; Or *Men in Irresolution* ; And the like. Whatsoever is of this kinde would be thorowly enquired. *Trialls* likewise would be made upon *Plants*, and that diligently : As if you should tell a *Man*, that such a *Tree* would *Dye* this yeare ; And will him at these and these times, to goe unto it, to see how it thriveth. As For *Inanimate Things*, it is true, that the *Motions* of *Shuffling of Cards*, or *Casting of Dice*, are very *Light Motions* : And there is a *Folly* very usefull, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be *Triall* also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more ; Or of Holding a *Key* between two *Mens Fingers*, without a *Charme* ; And to tel those that hold it, that at such *Name*, it shall go off their *Fingers*, For these two are extreme *Light Motions*. And howsoever I have no opinion of these things, yet so much I conceive to be true ; That *Strong Imagination* hath more Force upon *Things Living*, Or that have been *Living*, than *Things meerely Inanimate* : And more Force likewise upon *Light*, and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

958 It is an usuall *Observation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, upon the *Presence* of the *Murtherer*, hath opened the *Eyes* ; And that there have been such like *Motions*, as well where the *Partie Murthered* hath been *Strangled*, or *Drowned*, as where they have been *Killed by Wounds*. It may be, that this participateth of a *Miracle*, by *Gods Just Judgement*, who usually bringeth *Murders* to *Light*: But if it be *Naturall*, it must be referred to *Imagination*.

The Tying of the Point upon the day of Marriage, to make Men impotent towards their Wives, which (as we have formerly touched,) is so frequent in Zant, and Gascony, if it be Naturall, must be referred to the Imagination of Him that Tiethe the Point. I conceive it to have the lesse Affinitie with Witchcraft, because not Peculiar Persons onely, (such as Witches are,) but any Body may doe it.

959

There be many Things, that worke upon the Spirits of Man, by Secret Sympathy, and Antipathy: The Vertues of Precious Stones, worne, have beene anciently and generally Received; and curiously assigned to worke severall Effects. So much is true; That Stones have in them fine Spirits; As appeareth by their Splendour: And therefore they may work by consent upon the Spirits of Men, to Comfort, and Exhilarate them. Those that are the best, for that Effect, are the Diamond, the Emerald, the Iacynth Orientall, and the Gold-Stone, which is the Yellow Topaze. As for their particular Proprieties, there is no Credit to be given to them. But it is manifest, that Light, above all things, excelleth in Comforting the Spirits of Men: And it is very probable, that Light Varied doth the same Effect, with more Novelty. And this is one of the Causes, why Precious Stones comfort. And therefore it were good to have Tincted Lanthornes, or Tincted Skreenes, of Glasse Coloured into Greene, Blew, Carnation, Crimson, Purple, &c. And to use them with Candles in the Night. So likewise to have Round Glasses, not onely of Glasse Coloured thorow, but with Colours laid between Cristals, with Handles to hold in ones Hand. Prismes are also Comfortable Things, they have of Paris-Work, Looking-Glasses, bordered with broad Borders of small Cristal and great Counterfeit Precious Stones, of all Colours, that are most Glorious and Pleasant to behold; Especially in the Night. The Pictures of Indian Feathers, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare Pooles doe greatly comfort the Eyes, and Spirits; Especially when the Sunne is not Glaring but Overcast; Or when the Moone shineth.

Experiments
in:Confort,
touching the
Secret Vertue
of Sympathy,
and Antipathy.

960

There be divers Sorts of Bracelets fit to Comfort the Spirits; And they be of Three Intentions: Refrigerant; Corroborant; and Aperient. For Refrigerant, I wish them to be of Pearle, or of Corall, as is used. And it hath beene noted that Corall, if the Party that weareth it be ill disposed, will wax Pale: Which I beleve to be true, because otherwise distemper of Heat wil make Corall lose Colour. I Commend also Beads, or little Plates of Lapis Lazuli; And Beads of Nitre, either alone, or with some Cordiall Mixture.

961

For Corroboration and Confortation, take such Bodies as are of Astringent Quality, without Manifest Cold. I commend Bead-Amber, which is full of Astringtion, but yet is Vnctious, and not Cold; And is conceived to Impinguate those that weare such Beads: I commend also Beads of Harts-Horne, and Ivory, which are of the like Nature; Also Orange-Beads; Also Beads of Lignum Aloes, Macerated first in Rose-Water, and Dried.

962

For Opening, I Commend Beads, or Peeces of the Roots of Carduus Benedictus: Also of the Roots of Piony the Male; And of Orris; And of Calamus Aromaticus; And of Rew.

963

The Cramp, (no doubt) commeth of Contraction of Sinewes; Which is Manifest, in that it commeth either by Cold, or Drinesse; As after Consumptions, & Long Agues; For Cold and Drinesse do (both of them) Contract, and Corrugate. We see also, that Chafing a little above the Place in paine, easeth the Cramp; Which is wrought by the Dilatation, of the Contracted Sinewes, by Heat. There are in use, for the Prevention of the Cramp, two Things; The

964

The one *Rings* of *Sea-Horse Teeth*, worne upon the *Fingers* ; The other *Bands* of *Greene Perewinckle*, (the Herb,) tied about the *Calf* of the *Leg*, or the *Thigh*, &c. where the *Cramp* useth to come. I doe finde this the more strange, because Neither of these have any *Relaxing Vertue*, but rather the *Contrary*. I judge therefore, that their *Working* is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse, Than upon the *Bodily Substance* of the *Nerves*.

965 I would have *Triall* made of two other *Kindes* of *Bracclets*, for *Comforting* the *Heart*, and *Spirits* ; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads* ; For since they doe great Good Inwards, (especially for *Pestilent Agues*,) it is like they will be *Effectuall* Outwards ; Where they may be applyed in greater *Quantity*. There would be *Trochischs* likewise made of *Snakes* ; Whose *Flesh* dried, is thought to have a very *Opening*, and *Cordial Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes* ; Which is the *Principall Ingredient* in their *Cordiall Confection Alkermes* : The *Beads* would be made up with *Amber-Grice*, and some *Pomander*.

966 It hath beene long received, and confirmed by divers *Trialls* ; That the *Root* of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Falling-Sickness* ; And likewise the *Incubus*, which we call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine* : And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation* ; Which that *Simple* hath. I judge the like to be in *Castoreum*, *Muske*, *Ren-Seed*, *Agnus Castus Seed*, &c.

967 There is a *Stone*, which they call the *Blond-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose* : Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quere*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue* ; For the *Toad* loveth *Shade*, and *Coolnesse*.

968 *Light* may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinkle*, how that those things, which assuage the *Strife* of the *Spirits*, do help diseases, contrary to the *Intention* desired : for in the *Curing* of the *Cramp*, the *Intention* is, to relax the *Sinewes* ; But the *Contraction* of the *Spirits*, that they strive lesse, is the best *Help* : So to procure easie *Travailes* of *Women*, the *Intention* is to bring down the *Childe* ; But the *Help* is, to stay the *Comming* down too *Fast* : Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation* ; But the best *Meanes* to do it, is by *Nitre*, *Diascordium*, and other *Cool Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily ; In the *Quenching* of the *Flame* of a *Pestilent Ague*, *Nature* is like *People* that come to quench the *Fire* of a *Honse* ; which are so busie, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Use*, that whatsoever appeaseth the *Contention* of *Spirits*, furthereth their *Action*.

969 The *Writers* of *Naturall Magick*, commend the *Wearing* of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit* : For that the *Snake* is thought to renew her *Youth*, by *Casting* her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a *Pecce* of a *Harts-Horne*, beause those *Renew*

970 It hath been *Anciently Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preservatives* against the *Plague* : Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*. Vide

Vide the Experiments 95. 96. and 97. touching the severall Sympathies, and Antipathies, for Medicinall Vse.

It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacitie* and *Digestion*; And so it may be, the *Parts* of him comfort the *Bowels*.

We see *Scare-Crowes*, are set up to keep *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried and hanged up in a *Dove-House*, wil scare away *Vermine*; such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with us, know *Dogs* better then *Wolves*.

The *Brains* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Brains* of *Hares*; *Brains* of *Hens*; *Brains* of *Deeres*, &c. And it seemeth to be incident to the *Brains* of those *Creatures*, that are *Fearefull*.

The *Ointment*, that *Witches* use, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Juyces* of *Smallage*, *Wolfe-Bane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose, that the *Soporiferous Medicines* are likeliest to do it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-leaves*, &c.

It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheep*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone* bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder* provoketh *Choler*.

It hath beene observed, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eate *Quinces* much, and *Coriander-seed*, (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *braine*,) it will make the *Childe* *Ingenious*: And on the contrarie side, if the *Mother* eat (much) *Onions* or *Beanes*, or such *Vapourous Food*; Or drinke *Wine* or *Strong Drinke*, immoderately; Or *Fast* much; Or be given to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It indangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same *Judgement* of *Tobacco*, often taken by the *Mother*.

The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape* worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audicity*. It is true, that the *Ape* is a *Mery* and *Bold Beast*. And that the same *Heart* likewise of an *Ape* applyed to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sicknesse*: The *Ape* also is a *Witty Beast*, and hath a *Drie Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to move *Dreames* also. It may be the *Heart* of a *Man* would doe more, but that it is more against *Mens* mindes to use it; Except it be in such as weare the *Reliques* of *Saints*.

The *Flesh* of a *Hedge-Hog*, Dressed, and Eaten, is said to be a great *Drier*: It is true, that the *Juyce* of a *Hedge-Hog*, must needs be *Harsh*, and *Drie*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of *Prickles*, are generall *Dry*: As *Briers*, *Thornes*, *Barberries*: And therefore the *Ashes* of an *Hedge-Hog* are said to be a great *Disiccative* of *Fistula's*.

Mummy hath great force in *Stanching* of *Blood*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a *Secret Propriety*; In that the *Blond* draweth *Mans Flesh*. And it is approved, that the *Mosse*, which groweth upon the *Skull* of a *Dead Man* unburied, will stanch *Blond* Potently. And so to doe the *Dregs* or *Powder* of *Blond*, severed from the *Water*, and *Dried*.

981

It hath been practised, to make *White Swallows*, by *Anointing* of the eggs with *Oyle*, Which effect may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Juyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Anointing* of the *Egs*, will be as *Effectuall*, as the *Anoynting* of the *Body*; Of which *Vide* the *Experiment* 93.

982

It is reported, that the *White* of an *EGge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltnesse*, and maketh the *Water* sweeter. This may be by *Adhesion*; as in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *EGge*, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. Wee see that *Salt* laid to a *Cut finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

983

It hath been anciently received, that the *Sea Hare* hath an *Antipathy* with the *Lungs*, (if it commeth neere the *Body*,) and erodeth them. Whereof the *Cause* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watry Parts* of the *Body*; As *Vrine* and *Hydropical Water*. And it is a good *Rule*, that whatsoever hath an *Operation* upon certain *Kindes* of *Matters*, that, in *Mans Body*, worketh most upon those *Parts*, wherein that kinde of *Matter* aboundeth.

984

Generally, that which is *Dead* or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odi-ous* to *Man*; A *Carri- on* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vleers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprosie*, to *Sound Flesh*; And the *Excrements* of every *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* then the *Corruptions*.

985

It is a *Common Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection* some *Petty Fellow* is sent out to kill the *Dogs*; And that though they have never seene him before, yet they will all come forth, and barke, and flie at him.

986

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so uncertain, as they require a great deale of *Examination*, ere we conclude upon them. I would have it first thorowly inquired, whether there be any *Secret Passages* of *Sympathy* between *Persons* of neare *Blood*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse-Children*, *Husbands*, *Wives*, &c. There be many reports in *Historie*, that upon the *Death* of *Persons* of such Nearenesse, *Men* have had an inward *Feeling* of it. I my *Selfe* remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dream*, which I told to divers *Englisb Gentlemen*; That my *Fathers House* in the *Countrie*, was *Plastered* all over with *Blacke Mortar*. There is an *Opinion* abroad, (whether idle or no I cannot say,) That loving and kinde *Husbands* have a *Sense* of their *Wives* breeding *Childe*, by some *Accident* in their owne *Bodie*.

987

Next to those that are Neare in *Bloud*, there may be the like *Passage*, and *Instincts* of *Nature*, between great *Friends* and *Enemies*: And sometimes the *Revealing* is unto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus commineus* (a grave *Writer*,) reporteth; That the *Arch-Bishop* of *Vienna*, (a *Reverend Prelate*,) said (one day) after *Masse*, to *King Lewis* the eleventh of *France*; Sir, your *Mortall Enemy* is dead; What time *Charles Duke* of *Burgundy* was Slain, at the *Battell* of *Granson*, against the *Switzers*. Some trial also would be made, whether *Pact* or *Agreement* do any thing; As if two *Friends* should agree, that such a *Day* in every *Week*, they being

being in farre *Distant Places*, should *Pray* one for Another; Or should put on a *Ring* or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promise*, the other should have any *Feeling* of it, in *Absence*.

If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victory* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth; Because of the great *Ioy*, or *Griefe*, that many *Men* are posselt with at once? *Pius Quintus*, at the very time, when that *Memorable Victory* was won, by the *Christians*, against the *Turkes*, at the *Navall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistory*, brake off suddenly, and said to those about him, *It is now more time we should give thanks to God, for the great Victory he hath granted us, against the Turks*; It is true, that *Victory* had a *Sympathy* with his *Spirit*; For it was meerely his *Worke*, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had *Newes* of *Victories*, and *Overthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition*: Namely, that men observe when *Things Hit*, and not when they *Misse*: And commit to *Memorie* the one, and forget and passe over the other. But touching *Divination*, and the *Misgiving* of *Mindes*, we shall speake more, when we handle in generall the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

We have given formerly some *Rules* of *Imagination*; and touching the *Fortifying* of the Same. We have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherein you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating* or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himsele thinketh most commodious; Giving now but a few *Examples* of every of the *Three Kindes*.

Use some *Imaginant*, (observing the *Rules*, former prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Coeke* more *Hardy*, and the other more *Cowardly*. It would be tried also in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hart*, with *Grey Hounds*; Or in *Horse-Races*; And the like *Comparative Motion*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not runne.

In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter Sort* of *Motions*: As upon the sudden *Fading*, or *Lively Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c.

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon *Staying*

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ing the *Working* of *Beere*, when the *Barke* is put in ; Or upon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* be put in.

993 It is an Ancient Tradition, everie were alleaged, for Example of Secret Proprieties and Influxes, that the *Torpedo Marina* if it be touched with a long Sticke, doth stupifie the Hand of him that toucheth it. It is one degree of *Working* at Distance, to work by the Continuance of a Fit Medium ; As Sound will be conveyed to the Eare, by striking upon a Bow-String, if the Horne of the Bow be held to the Eare.

994 The Writers of Naturall Magick, doe attribute much to the Vertues, that come from the Parts of Living Cratures ; So as they be taken from them, the Creatures remaining still alive : As if the Creature still living did infuse some Immaterial Vertue, and Vigour into the Part Severed. So much may be true ; that any Part, taken from a Living Creature, newly Slaine, may be of greater force then if it were taken from the like Creature, dying of it selfe, because it is fuller of Spirit.

995 Triall would be made, of the like Parts of Individualls, in Plants, and Living Creatures ; As to cut off a Stock of a Tree ; And to lay that, which you cut off, to Putrifie, to see whether it will Decay the Rest of the Stock : Or if you should cut off part of the Taile, or Legge of a Dogge, or a Cat, and lay it to Putrifie, and to see whether it will Fester, or keep from Healing, the Part which remaineth.

996 It is received, that it helpeth to Continue Love, if one weare a Ring, or a Bracelet of the Haire of the Party Beloved. But that may be by the Exciting of the Imagination : And perhaps a Glove, or other like Favour, may as well doe it.

997 The Sympathie of Individualls, that have been Entire, or have Touched, is of all others the most Incredible : Yet according unto our faithfull Manner of Examination of Nature, we wil make some little mention of it. The Taking away of Warts, by Rubbing them with Somewhat that afterwards is put to waste, and consume, is a Common Experiment : And I doe apprehend it the rather, because of mine one Experience. I had from my Childhood, a Wart upon one of my Fingers : Afterwards when I was about Sixteen Yeares, old, being then at Paris, there grew upon both my Hands a Number of Warts, (at least an hundred,) in a months space, The English Embassadors Lady, who was a Woman far from Superstition, told me one day ; She would help me away with my Warts : Whereupon she got a Peece of Lard with the Skin on, and rubbed the Warts all over with the Fat Side ; and amongst the rest, that Wart which I had had from my Childhood ; Then she nailed the Peece of Lard, with the Fat towards the Sunne, upon a Poast of her Chamber Window which was to the South. The Successe was, that within five weeks space, all the Warts went quite away : And that Wart, which I had so long endured, for Company. But at the rest I did little marvell, because they came in a Short time, and might go away in a Short Time again : But the Going of that, which had staid so long, doth yet stick with me. They say the like is done by the Rubbing of Warts with a Green Elder Stick, & then Burying the Stick to Rot in Mucke. It would be tried, with Cornes and Wens, and such other Excrescences, I would have it also tried, with some Parts of Living Creatures, that are nearest the Nature of Excrescences ; As the Combs of Cocks, the Spurres of Cocks, the Hornes of Beasts, &c. And I would have it tried both wayes ; Both by Rubbing those Parts with Lard, or Elder, as before ; And by Cutting off some Peece of those Parts, and laying it to Consume. To see whether it wil Worke any Effect, towards the Consumption of that Part, which was once Ioyned with it.

It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, wil heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men of Credit*, (though my selfe, as yet, am not fully inclined to beleeeve it,) you shal note the *Points* following; First, the *Ointment*, wherewith this is done, is made of *Divers Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* upon the *Skull* of a dead *Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These Two last I could easily suspect to be prescribed as a *Starting Hole*; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due *Time*; For as for the *Mosse*, it is certain there is great *Quantity* of it in *Ireland*, upon *Slain Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Bloud-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the whole *Ointment* is to be found in *Chymicall Dispensatory* of *Crollins*. Secondly, the same *Kind* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they do not observe the *Consecring* of the *Ointment*, under any certain *Constellation*; which comonly is the *Excuse* of *Magickall Medicines*, when they fail, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge* of the *Party Wounded*; And thus much hath been tried, that the *Ointment* (for *Experiments* sake,) hath been wiped off the *Weapon*, without the *Knowledge* of the *Party Hurt*, and presently the *Party Hurt*, hath been in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will serve, and work the *Effect*. This I doubt should be a *Device*, to keep this strange *Forme* of *Cure*, in *Request*, and *Use*. Because many times you cannot come by the *Weapon* it selfe. Seventhly, the *Wound* must be at first *Washed* clean, with *White Wine*, or the *Parties* own *Water*; And then bound up close in *Fine Linen*, and no more *Dressing* renewed, till it be whole. Eighthly, the *Sword* it selfe must be *Wrapped* up close, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keep it, will *Serve* again; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre shorter *Times*, than *Ointment* of *Wounds* commonly doe. Lastly it will *Cure* a *Beast*, as well as a *Man*; which I like best of al the rest, because it subjecteth the *Matter*, to an *Easie Triall*.

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by *Ascribing* them to *Secret* and *Hidden Vertues* and *Proprieties*; (For this hath arrested, and laid a sleep, al true *Enquiry*, and *Indications*;) yet I do not understand, but that in the *Practical Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this is not only in the in *Specie* but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*; That it must go to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamae-pyris*,

Experiment
Solitary, touching
Secret
Proprieties.
999

pylis or the like, drunk in Beere, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies*, that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will do good in one *Body*, which will not doe good in another; According to the Correspondence the *Medicine* hath to the *Individuall body*.

Experiment
Solitary, touch-
ing the Ge-
neral Sympathy
of Mens Spirit
1000.s.

THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submission*, and *Subjection* of other *Mens Mindes*, *Wills*, or *Affections*, (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull and agreeable to the *Nature* of *Man*. This *Thing* (surely) is not without some Signification, as if all *spirits* and *soules* of *Men*, came forth out of one *Divine Limbus*; Else why be men so much affected with that, which others think, or say? The best Temper of *Mindes* desireth *Good Name*, and *True Honour*: The *Lighter*, *Popularity*, and *Applause*; The more depraved, *Subjection*, and *Tyranny*; As is seen in great *Conquerors*, and *Troublers* of the *World*: And yet more in *Arch-Hereticke*s; for the Introducing of new *Doctrines*, is likewise an *Affectation* of *Tyranny* over the *Vnderstandings*, and *Beleefes* of *Men*.

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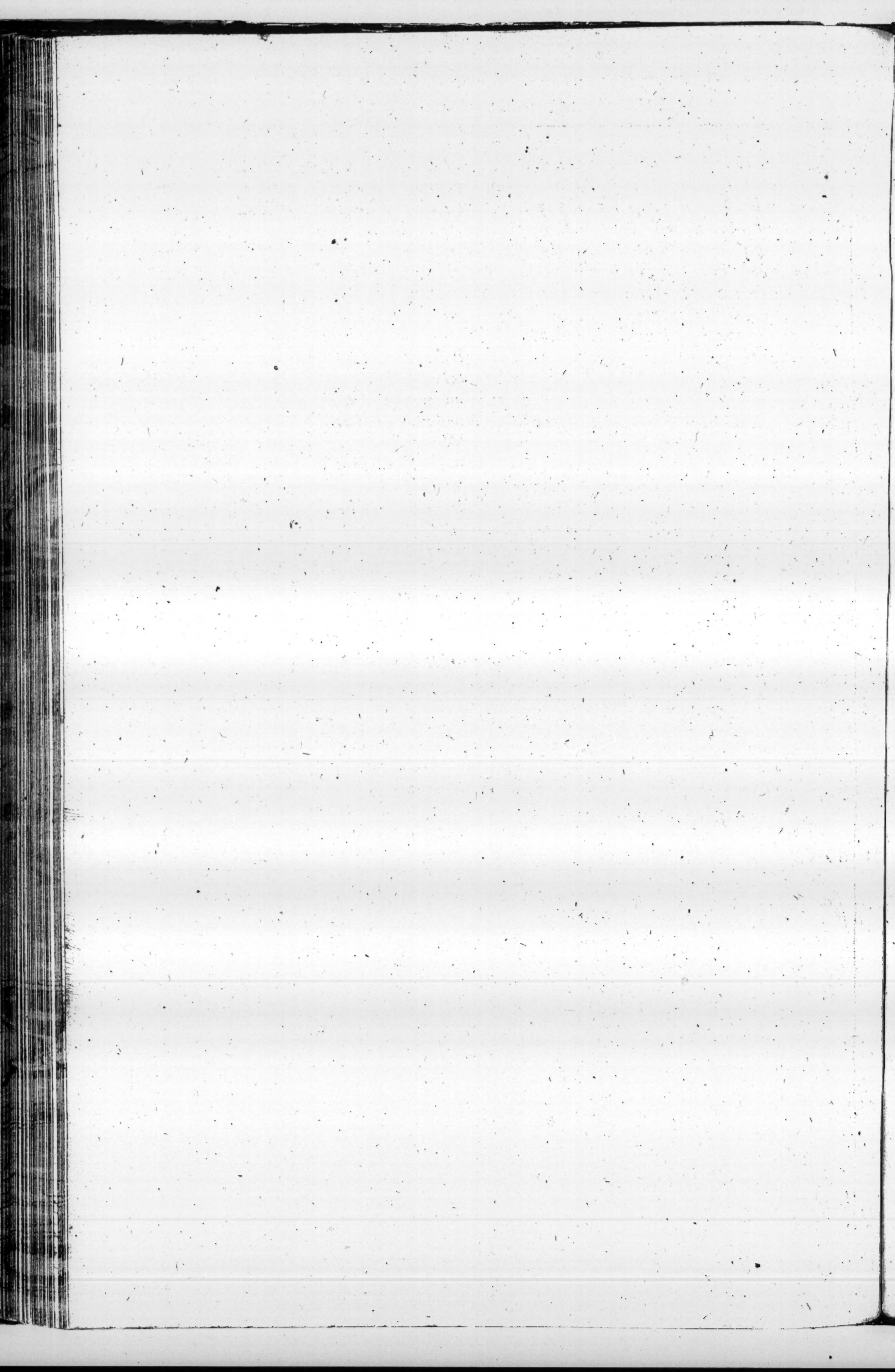
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FINIS.





His Lo^{ps}. Vsual Receipt for the Gout, to which
the Sixtieth Experiment hath reference, was this

To be taken in this Order.

1. The Pultasse.

R. Of Manchett, about 3. Ounces, the Crumme only, thin cut ; Let it be
boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and
an halfe, of the powder of Red Roses.

Of Saffron 10. Graines.

Of Oyle of Roses an Ounce.

Let it be spread upon a Linnen Cloth, and applied luke-warme; And
continued for three Houres space.

2. The Bath, or Fomentation.

R. Of Sage Leaves, halfe a handfull.

Of the Root of Hemlocke, Sliced, 6. Drams.

Of Briony Roots, halfe an Ounce.

Of the Leaves of Red Roses, 2. Pugills.

Let them be boyled in a pottle of Water, wherein steele hath beene
quenched till the Liquour come to a quart. After the Straining, put
in halfe a handfull of Bay-Salt.

Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Li-
quour, hot, and so renewed seven times; All in the space of a quarter
of an Houre, or little more.

3. The Plaster.

R. Emplastrum Diacalciteos, as much as is sufficient, for the part you
meane to cover. Let it be dissolved with Oyle of Roses, in such a Con-
sistence, as will sticke; And spread upon a peece of Holland, and applied.



NEW ATLANTIS.

A Worke unfinished.

Written by the Right Honourable, FRANCIS,
Lord Verulam, Viscount St. Alban.





To the Reader.

His *Fable* my *Lord* devised, to the end that He might exhibit therein, a *Modell* or *Description* of a *Colledge*, instituted for the *Interpreting* of *Nature*, and the producing of *Great* and *Marvellous Workes*, for the *Benefit* of *Men*; Vnder the Name of *Salomons House*, or the *Colledge* of the *Six Dayes Workes*. And even so farre his *Lordship* hath proceeded, as to finish that Part. Certainly the *Modell* is more *Vast*, and *High*, than can possibly be imitated in all things; Notwithstanding most Things therein are within Mens Power to effect. His *Lordship* thought also in this present *Fable*, to have composed a *Frame* of *Lawes*, or of the best *State* or *Mould* of a *Common-wealth*; But foreseeing it would be a long Work, his Desire of Collecting the *Naturall History* diverted him, which He preferred many degrees before it.

This Worke of the *New Atlantis* (as much as concerneth the *English Edition*) his *Lordship* designed for this place; In regard it hath so neare Affinity (in one part of it) with the preceding *Naturall History*.

W. Rawley.

Class. VI



NEW ATLANTIS



WE failed from *Pern*, (where we had continued by the space of one whole yeare) for *China* and *Iapan*, by the South Sea ; taking with us Victuals for twelve Moneths ; And had good Winds from the East, though soft and weake, for five Moneths space and more. But then the Wind came about, and settled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne backe. But then againe there arose Strong and Great winds from the South, with a Point East ; which carryed us up, (for all that we could doe) towards the North : By which time our Victuals failed us, though we had made good spare of them. So that finding our selves, in the Midst of the greatest Wildernesse of waters in the world, without Victuall, wee gave our Selves for lost Men, and prepared for death. Yet wee did lift up our Hearts and Voices to GOD above, *who sheweth his Wonders in the Deepe* ; Beseeching him of his Mercy, that as in the *Beginning* Hee discovered the Face of the *Deepe*, and brought forth *Drie-Land* : So he would now discover Land to us, that we might not perish. And it came to passe, that the next day about Evening, wee saw within a Kenning before us, towards the North, as it were thicke-Clouds, which did put us in some hope of Land : Knowing how that part of the South-Sea was utterly unknowne : And might have Islands or Continents, that hitherto were not come to light. Wherefore we bent our course thither, where we saw the appearance of Land, all that night : And in the Dawning of the next Day, wee might plainly discern that it was a Land Flat to our sight, and full of Boscage : which made it shew the more Darke. And after an Houre and a halfes Sayling, we entered

tred into a good *Haven*, being the Port of a faire *City*. Not great indeed, but well built, and that gave a pleasant view from the Sea. And wee thinking every Minute long, till wee were on Land, came close to the Shore and offered to land. But straightwayes we saw divers of the People, with Bastons in their Hands, (as it were) forbidding us to land: Yet without any Cryes or Fiercenesse, but only as warning us off, by Signes that they made. Whereupon being not a little discomforted, we were advising with our selves, what we should doe. During which time, there made forth to us a small Boat, with about eight Persons in it, whereof One of them had in his Hand a Tipstaffe of a yellow Cane, tipped at both ends with Blew, who made aboard our Shippe, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, hee drew forth a little Scroule of Parchment (somewhat yellower then our Parchment, and shining like the Leaves of Writing Tables, but otherwise soft and flexible,) and delivered it to our formost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish* these words; *Land ye not, none of you, and provide to be gone from this Coast, within sixteen dayes, except you have further time given you: Meane while, if you want Fresh Water, or Vi&etnuall, or helpe for your Sicke, or that your Shippe needeth repaire, write downe your wants, and you shall have that which belongeth to Merrey.* This Scroule was signed with a Stampe of *Cherubims Wings*, not spred, but hanging downewards; And by them a *Crosse*. This being delivered, the Officer returned, and left onely a Servant with us to receive our Answer. Consulting hereupon amongst our Selves, we were much perplexed. The Deniall of Landing, and Hasty Warning us away, troubled us much: On the other side, to finde that the People had Languages, and were so full of Humanity, did comfort us not a little. And above all, the Signe of the *Crosse* to that Instrument, was to us a great Rejoycing, and as it were a certaine Presage of Good. Our Answer was in the *Spanish* tongue; *That for our Ship, it was well; For we had rather met with Calmes and contrary winds, then any Tempests. For our Sicke, they were many, and in very ill Case; So that if they were not permitted to Land, they ran in danger of their Lives.* Our other Wants wee set downe in particular, adding; *That wee had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable*

ble unto them. Wee offered some Reward in Pistolets unto the Servant, and a peece of Crimson Velvet to be presented to the Officer: But the Servant tooke them not, nor would scarce look upon them; And so left us, and went backe in another little Boat which was sent for him.

About three Houres after wee had dispatched our Answer, there came toward us, a Person (as it seemed,) of a place. Hee had on him a Gowne with wide Sleeves, of a kinde of Water Chamolet, of an excellent Azure Colour, far more glossy than ours: His under Apparell was greene, and so was his Hat, being in the forme of a Turban, daintily made, and not so huge as the *Turkish* Turbans; And the Lockes of his Haire came downe below the Brimmes of it. A Reverend Man was hee to behold. Hee came in a Boat, gilt in some part of it, with foure Persons more onely in that Boat; And was followed by another Boat, wherein were some Twenty. When hee was come within a Flight-shot of our Ship, Signes were made to us, that we should send forth some to meet him upon the water, which we presently did in our Ship-Boat, sending the principall Man amongst us save one, and foure of our Number with him. When wee were come within six yards of their Boat, they called to us to stay, and not to approach further, which we did. And thereupon the Man, whom I before described, stood up, and with a loud voice in *Spanish*, asked, *Are ye Christians?* Wee answered; *We were*; fearing the lesse, because of the Crosse we had seene in the Subscription. At which Answer the said Person lift up his Right Hand towards Heaven, and drew it softly to his Mouth (which is the Gesture they use, when they thanke GOD;) And then said: *If ye will sweare, (all of you,) by the Merits of the SAVIOUR, that ye are no Pirates; Nor have shed bloud, lawfully, nor unlawfully, within forty dayes past; you may have License to come on Land.* Wee said, *We were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a Notary, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boat, after his Lord had spoken a little to him, said aloud: *My Lord would have you know, that it is not of Pride, or Greatnesse, that he commeth not aboard your Ship: But for that, in your Answer, you declare, that you have many Sicke amongst you, he was warned by the Conservatour of Health, of the City, that he should keepe a distance.* Wee bowed our selves towards him, and answered: *We were*

were his humble Servants ; And accounted for great Honour, and singular Humanity towards us, that which was already done : But hoped well, that the Nature of the Sicknesse, of our Men, was not infectious. So he returned ; And a while after came the Notary to us aboard our Ship ; Holding in his hand a Fruit of that Country, like an Orenge, but of colour betweene Orenge-tawny and Scarlet : which cast a most excellent Odour. He used it (as it seemeth) for a Preservative against Infection. He gave us our Oath ; By the Name of Iesus, and his Merits : And after told us, that the next day by six of the Clocke in the Morning, we should be sent to, and brought to the Strangers House, (so he called it,) where we should be accommodated of things, both for our Whole, and for our Sicke. So he left us ; And when we offered him some Pistolets, he smiling, said : *He must not be twice paid for one Labour* : Meaning (as I take it) that he had Salary sufficient of the State for his Service. For (as I after learned) they call an Officer that taketh Rewards, *Twice-paid*.

The next Morning early, there came to us the same Officer, that came to us at first with his Cane, and told us : *Hee came to conduct us to the Strangers House : And that he had prevented the Houre, because we might have the whole day before us, for our Businesse. For (said hee). If you will follow my Advice, there shall first goe with me some few of you, and see the place, and how it may be made convenient for you : And then you may send for your Sicke, and the rest of your Number, which ye will bring on Land.* Wee thanked him, and said : *That this Care, which he tooke of desolate Strangers, GOD would reward.* And so six of us went on Land with him : And when we were on Land, he went before us, and turned to us, and said ; *Hee was but our Servant, and our Guide.* Hee led us through three faire Streets ; And all the Way wee went, there were gathered some People on both sides, standing in a Row : But in so civill a fashion, as if it had beene, not to wonder at us, but to welcome us ; And divers of them, as wee passed by them, put their Armes a little abroad, which is their Gesture, when they bid any welcome. The Strangers House is a faire and spacious House, built of Bricke, of somewhat a blewer Colour than our Bricke : And with handsome Windowes, some of Glasse, some of a kinde of Cambricke ovled. Hee brought us first into a faire Parlour above staires, and then asked us : *What number of Persons we were ? And how many sicke ?* we answered, *We were in all (sicke and whole) one and fifty Persons, whereof*
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our sicke were seventeene. He desired us to have patience a little, and to stay till he came backe to us; which was about an Houre after; And then he led us to see the Chambers, which were provided for us, being in number nineteene. They having cast it (as it seemeth) that foure of those Chambers, which were better then the rest, might receive foure of the principall Men of our Company; And lodge them Alone by themselves; And the other fifteene Chambers were to lodge us, two and two together. The Chambers were handsome and Chearefull Chambers, and furnished civilly. Then he led us to a long Gallery, like a Dorture, where he shewed us all along the one side (for the other side was but wall and window,) seventeene Cells, very neat ones, having partitions of Cedar wood. Which Gallery, and Cells, being in all forty, (many more then we needed,) were instituted as an Infirmary for sick Persons. And he told us withall, that as any of our Sick waxed well, he might be removed from his Cell, to a Chamber: For which purpose there were set forth ten spare Chambers, besides the number we spake of before. This done, he brought us backe to the Parlour, and lifting up his Cane a little (as they do when they give any Charge or Command) said to us; *Yee are to know that the Custome of the Land requireth, that after this day, and to morrow, (which we give you for removing your People from your Ship,) you are to keepe within doores for three daies. But let it not trouble you, nor doe not thinke your selves restrained, but rather left to your Rest and Ease. You shall want nothing; and there are sixe of our People appointed to attend you, for any Businesse you may have abroad.* We gave him thanks with all Affection and Respect, and said; *GOD surely is manifested in this Land.* We offered him also twenty Pistolets; But he smiled, and onely said; *What? Twice Paid!* And so hee left us. Soone after our Dinner was served in; Which was right good Viands, both for Bread, and Meat: Better then any Collegiate Diet, that I have knowne in *Europe*. We had also Drinke of three sorts, all wholesome and good; Wine of the Grape; A Drinke of Graine, such as is with us our Ale, but more cleare: and a kind of Sider made of a fruit of that Countrey; A wonderfull pleasing and Refreshing Drink. Besides, there were brought in to us, great Store of those Scarlet Orenge, for our Sicke; which (they said) were an assured Remedy for sicknesse taken at Sea. There was given us also, a Box of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills

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every night before sleep ; which (they said) would hasten their Recovery. The next day, after that our Trouble of Carriage, and Removing of our Men, and Goods out of our Ship, was somewhat settled and quiet, I thought good to call our Company together; and when they were assembled, said unto them; *My deare Friends, Let us know our selves, and how it standeth with us. We are Men cast on Land, as Jonas was, out of the Whales Belly, when we were as buried in the Deepe : And now wee are on Land, we are but betweene death and Life ; For wee are beyond, both the Old World and the New ; And whether ever we shall see Europe, GOD onely knoweth. It is a kinde of Miracle hath brought us hither : And it must be little lesse, that shall bring us hence. Therefore in regard of our Deliverance past, and our danger present, and to come, let us looke up to GOD, and every man reforme his owne waies. Besides we are come here amongst a Christian People, full of Pietie and Humanity : Let us not bring that Confusion of face upon our selves, as to shew our vices, or unworthinesse before them. Yet there is more : For they have by Commandement, (though in forme of Courtesie) Cloystred us within these Walls for three daies : Who knoweth, whether it be not, to take some taste of our manners and conditions ? And if they finde them bad, to banish us straight-waies ; if good, to give us further time. For these Men, that they have given us for Attendance, may withall have any eye upon us. Therefore for Gods love, and as wee love the weale of our Soules and Bodies, let us so behave our selves, as we may be at peace with GOD, and may finde grace in the Eyes of this People. Our Company with one voyce thanked me for my good Admonition, and promised me to live soberly and civilly, and without giving any the least occasion of Offence. So we spent our three daies joyfully, and without care, in expectation what would be done with us, when they were expired. During which time, we had every houre joy of the Amendment of our Sick ; who thought themselves cast into some Divine Poole of Healing ; They mended so kindly, and so fast.*

The Morrow after our three daies were past, there came to us a new Man, that we had not seene before, clothed in Blew as the former was, save that his Turban was white with a small red Crosse on the Topp. He had also a Tippet of fine Linnen. At his Comming in, he did bend to us a little, and put his Armes abroad. We of our parts saluted him in a very lowly and subbmiffive manner ; As looking that from him we should receive Sentence of Life, or Death. He desired to speake with
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some few of us ; Whereupon fixe of us onely stayed, and the rest avoided the Roome. He said ; *I am by Office Governour of this House of Strangers, and by Vocation I am a Christian Priest ; and therefore am come to you, to offer you my service, both as Strangers, and chiefly as Christians. Some things I may tell you, which I thinke you will not be unwilling to heare. The State hath given you Licence to stay on Land for the space of sixe weekes : And let it not trouble you, if your occasions aske further time, for the Law in this point is not precise ; And I do not doubt, but my selfe shall be able to obtaine for you such further time as shall be convenient. Yee shall also understand, that the Strangers House, is at this time Rich, and much aforehand ; For it hath laid up Revenew these 37. yeares : For so long it is since any Stranger arrived in this part : And therefore take ye no care ; The State will defray you all the time you stay : Neither shall you stay one day the lesse for that. As for any Merchandize you have brought, ye shall be well used, and have your returne, either in Merchandize, or in Gold and Silver : For to us it is all one. And if you have any other Request to make, hide it not. For ye shall finde, we will not make your countenance to fall, by the answer ye shall receive. Onely this I must tell you, that none of you must goe above a Karan, (that is with them a Mile and an halfe) from the walls of the Citie, without speciall leave. Wee answered after we had looked a while upon one another, admiring this gracious and parent-like usage ; That we could not tell what to say : For we wanted words to expresse our Thanks ; And his Noble free Offers left us nothing to aske. It seemed to us, that wee had before us a picture of our Salvation in Heaven : For we that were a while since in the lawes of Death, were now brought into a place, where we found nothing but Consolations. For the Commandement laid upon us, we would not faile to obey it, though it was impossible but our Hearts should be enflamed to tread further upon this Happie and Holie Ground. We added ; That our Tongues should first cleave to the Roofes of our Mouthes, ere wee should forget, either this Reverend Person, or this whole nation, in our Prayers. We also most humbly besought him to accept of us as his true servants, by as just a Right, as ever Men on Earth were bounden ; laying and presenting, both our Persons, and all we had at his feet. He said ; He was a Priest, and looked for a Priests reward ; which was our Brotherly love, and the good of our Soules and Bodies. So he went from us, not without Teares of Tenderneffe in his Eyes ; And left us also confused with joy and kindnesse, saying amongst our selves ; That we were come into a land of Angels ;*

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which did appeare to us daily, and prevent us with Comforts, which we thought not of, much lesse expected.

The next day about ten of the Clocke, the Governour came to us againe, and after Salutations, said familiarly; *That hee was come to visit us*; And called for a Chaire, and fate him downe: And we being some ten of us (the rest were of the meaner sort, or else gone abroad,) fate downe with him: And when we were set, he began thus. *We of this Island of Bensalem (for so they call it in their Language) have this: That by meanes of our solitary Situation, and of the Lawes of Secrecy, which we have for our Travellers, and our rare Admission of Strangers: we know well most part of the Habitable World, and are our selves unknowne. Therefore because he that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that ye aske me Questions, than that I aske you.* We answered: *That we humbly thanked him, that he would give us leave so to doe: And that we conceived by the taste we had already, that there was no worldly thing on Earth, more worthy to to be knowne, than the State of that happy Land. But above all (we said) since that we were met from the severall Ends of the world, and hoped assuredly, that we should meet one day in the Kingdome of Heaven (for that we were both Parts Christians) we desired to know (in respect that Land was so remote, and so divided by vast and unknowne Seas from the Land, where our SAVIOUR walked on Earth) who was the Apostle of that Nation, and how it was converted to the faith?* It appeared in his face, that he tooke great Contentment in this our Question: He said, *Ye knit my Heart to you, by asking this Question in the first place: For it sheweth, that you First seeke the Kingdome of Heaven: And I shall gladly, and briefly, satisfie your demand.*

About twenty Yeares after the Ascention of our SAVIOUR, it came to passe, that there was seene by the people of Renfusa, (a City upon the Easterne Coast of our Island, (within night,) the Night was Cloudy and Calme,) as it might be some mile in the Sea, a great Pillar of Light; Not sharpe, but in forme of a Columne, or Cylinder, rising from the Sea, a great way up towards Heaven: and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Body of the Pillar. Vpon which so strange a Spectacle, the People of the City gathered apace together upon the Sands, to wonder; And so after put themselves into a number of small Boats to goe nearer to this Marveilous sight. But when the Boats were come within (about) sixty yards of the Pillar, they found themselves all bound, and

and could goe no further, yet so as they might move to goe about, but might not approach nearer: So as the Boats stood all as in a Theater, beholding this Light, as an Heavenly Signe. It so fell out, that there was in one of the Boats, one of the Wise Men, of the Society of Salomons House: which House or College (my good Brethren is the very Eye of this Kingdome; Who having a while attentively and devoutly viewed, and contemplated this Pillar and Crosse, fell downe upon his face: And then raised himselfe upon his knees, and lifting up his Hands to Heaven, made his prayers in this manner.

Lord God of Heaven and Earth ; thou hast vouchsafed of thy Grace, to those of our Order to know thy Workes of Creation, and true Secrets of them ; And to discern (as farre as appertaineth to the Generations of Men) betweene Divine Miracles, Workes of Nature, Workes of Art and Impostures, and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing wee now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as wee learne in our Bookes, that thou never Workest Miracles, but to a Divine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but upon great cause) we most humbly beseech thee, to prosper this great Signe, And to give us the Interpretation and use of it in Mercy; Which thou dost in some part secretly promise, by sending it unto us.

When he had made his Prayer, he presently found the Boate hee was in, moveable and unbound ; whereas all the rest remained still fast ; And taking that for an assurance of Leave to approach, hee caused the Boate to be softly, and with silence rowed towards the Pillar. But ere he came neare it, the Pillar and Crosse of Light brake up ; and cast it selfe abroad, as it were into a Firmament of many Starres ; which also vanished soone after, and there was nothing left to be seene, but a small Arke, or Chest of Cedar, dry, and not wet at
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all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small green Branch of Palme; And when the wise man had taken it with all reverence into his Boat, it opened of it selfe, and there were found in it a Book, and a Letter; Both written in fine Parchment, and wrapped in Sindons of Linnen. The Book contained all the Canonickall Books of the Old and New Testament, according as you have them; (For wee know well what the Churches with you receive;) And the Apocalypse it selfe; And some other Books of the New Testament, which were not at that time written, were neverthelesse in the Booke. And for the Letter, it was in these words.

I Bartholomew, a Servant of the Higbest, and Apostle of JESVS CHRIST, was warned by an Angell that appeared to me, in a vision of Glory, that I should commit this Arke to the flouds of the Sea. Therefore I doe testifie and declare, unto that People, where GOD shall ordaine this Arke to come to Land, that in the same day is come unto them Salvation, and Peace, and Good Will, from the Father, and from the LORD JESVS.

There was also in both these Writings, as well the Booke, as the Letter, wrought a great Miracle, Conforme to that of the Apostles, in the Originall Gift of Tongues. For there being at that time, in this Land, Hebrewes, Persians, and Indians, besides the Natives, every one read upon the Booke, and Letter, as if they had been written in his owne Language. And thus was this Land saved from infidelitie; (as the Remaine of the Old World was from Water) by an Arke, through the Apostolicall and Miraculous Evangelisme of S. Bartholomew. And here he paused, and a Messenger came, and called him forth from us. So this was all that passed in that Conference.

The next Day, the same Governour came againe to us, immediately after Dinner, and excused himselfe, saying; That the Day before he was called from us somewhat abruptly, but now hee would make us amends, and spend time with us, if wee held his Company and Conference agreeable; We answered; That we held it so agreeable and pleasing to us, as wee forgot both Dangers past, and Feares

Feares to come, for the time we heard him speake ; And that wee thought an houre spent with him, was worth Yeares of our former life. Hee bowed himselfe a little to us, and after we were set againe, he said ; *Well, the Questions are on your part.* One of our Number said, after a little Pause ; *That there was a Matter, we were no lesse desirous to know, than fearefull to aske, least we might presume too farre. But encouraged by his rare Humanity towards us, (that could scarce thinke our selves strangers, being his vowed and professed Servants,) wee would take the Hardnesse to propound it: Humbly beseeching him, if he thought it not fit to be answered, that he would pardon it, though he rejected it.* We said ; *We well observed those his words, which he formerly spake, that this happy Island, where we now stood, was knowne to few, and yet knew most of the Nations of the World, which we found to be true, considering they had the Languages of Europe, and knew much of our State and Businesse : And yet we in Europe (notwithstanding all the remote Discoveries, and Navigations of this last Age) never heard any of the least Inking or Glimpse of this Island. This we found wonderfull strange ; For that all Nations have Enterknowledge one of another, either by Voyage into Forraine Parts, or by Strangers that come to them : And though the Traveller into a Forraine Countrey, doth commonly know more by the Eye, than he that stayeth at home can by relation of the Traveller ; Yet both wayes suffice to make a mutuell Knowledge, in some degree, on both parts. But for this Island, we never heard tell of any Ship of theirs, that had been seen to arrive upon any shore of Europe ; No, nor of either the East or West Indies, nor yet of any Ship of any other part of the World, that had made returne for them. And yet the Marvell rested not in this. For the Situation of it (as his Lordship said,) in the secret Conclave of such a vast Sea mought cause it. But then, that they should have Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to us a condition and Proprietie of Divine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to them. At this speech the Governour gave a gracious smile and said ; *That we did well to aske pardon for this Question we now asked; For that it imported, as if we thought this Land a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes, and Intelligence of other Countries.* It was answered by us all, in all possible humblenesse, but yet with a Countenance taking knowledge, that we knew that hee*

he spake it but merrily. That we were apt to enough to think, there was somewhat supernaturall in this Island, but yet rather as Angelicall, than Magicall. But to let his Lordship know truely, what it was that made us tender and doubtfull to aske this Question, it was not any such conceit, but because we remembered, hee had given a Touch in his former Speech, that this Land had Lawes of Secrecy touching Srangers: To this he said; You remember it aright: And therefore in that I shall say to you, I must reserve some particulars, which it is not lawfull for me to reveale; but there will be enough left, to give you satisfaction.

You shall understand (that which perhaps you will scarce thinke credible) that about three thousand Yeares agoe, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater than at this Day. Doe not thinke with your selves, that I know not how much it is increased with you, within these threescore Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Arke, that saved the Remnant of Men, from the universall Deluge, gave Men confidence to adventure upon the waters; Or what it was; but such is the truth. The Phœnicians, and specially the Tyrians, had great Fleets. So had the Carthaginians their Colony, which is yet further West. Toward the East the Shipping of Egypt, and of Palestina, was likewise great. China also, and the great Atlantis, (that you call America) which have now but Lunks, and Canoas, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fiftene hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But wee have large Knowledge thereof.

At that time, this Land was knowne and frequented by the Ships and Vessels of all the Nations beforenamed. And (as it cometh to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; So as almost all Nations of Might and Fame resorted hither; Of whom, we have some Stirps, and little Tribes with us, at this day. And for our own Ships, they went sundry Voyages, as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambalaine) and Quinzy, upon the Orientall Seas, as farre as to the Borders of the East Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description

scription which is made by a great Man with you, that the Descendants of Neptune planted there ; and of the Magnificent Temple, Pallace, City, and Hill ; and the manifold streames of goodly Navigable Rivers, (which as so many Chaines invironed the same Site, and Temple ; And the severall Degrees of Ascent, whereby Men did climbe up to the same, as if it had beene a Scala Coeli ; be all Poeticall and Fabulous : Yet so much is true, that the said Countrey of Atlantis ; As well that of Peru then called Coya, as that of Mexico, then named Tyrambel, were mighty and proud Kingdomes, in Armes, Shipping, and Riches : So mighty, as at one time, (or at least within the space of ten yeares,) they both made two great Expeditions ; They of Tyrambel through the Atlantique to the Mediterane Sea ; and they of Coya, through the South Sea upon this our Island : And for the former of these, which was into Europe, the same Author amongst you, (as it seemeth) had some relation from the Ægyptian Priest, whom he citeth. For Assuredly, such a thing there was. But whether it were the Ancient Athenians, that had the glory of the Repulse, and Resistance of those Forces I can say nothing : But certaine it is there never came backe, either Ship, or Man from that Voyage. Neither had the other Voyage of those of Coya upon us, had better fortune, if they had not met with enemies off greater clemency. For the King of this Island, (by name Altabin,) a wise Man, and a great Warriour ; Knowing well both his owne strength, and that of his Enemies ; handled the matter so, as he cut off their Land-Forces, from their Ships, and entoyled both their Navy, and their Campe, with a greater Power than theirs, both by Sea and Land : And compelled them to render themselves without striking stroke : And after they were at his Mercy, contenting himselfe onely with their Oath, that they should no more beare Armes against him, dismissed them all in safety. But the Divine revenge overtooke not long after those proud Enterprises. For within lesse than the space of one Hundred Yeares, the Great Atlantis was utterly lost and destroyed : Not by a great Earthquake, as your Man saith ; (For that whole Tract is little subject to Earthquakes ;) But by a particular Deluge, or Inundation ; Those Countries having, at this Day, farre greater Rivers, and farre higher Mountaines, to poure downe Waters, than any part of the Old World. But it is true, that the same Inundation was not deepe ; Not past forty foot, in most places, from the Ground ; So that although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saved by flying to the High Trees and Woods. For as for Men, although they had

Buildings in many places, higher than the Depth of the Water ; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as marvell you not at the thinne Population of America, nor at the Rudenesse and Ignorance of the People ; For you must account your Inhabitants of America as a yong People ; younger a thousand yeares, at the least, than the rest of the World : For that there was so much time, betweene the Univerfall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey again slowly, by little and litile ; And being simple and a savage People (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leave Letters, Arts, and Civilitie to their Posteritie ; And having likewise in their Mountainous Habitations been used, (in respect of the Extreme Cold of those Regions,) to cloath themselves with the Skinnes of Tygers, Beares, and great Hairy Goats, that they have in those Parts; When after they came downe into the Valley, and found the intolerable Heats which are there, and knew no meanes of lighter Apparell ; they were forced to begin the custome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds ; And this also they tooke from those their Ancestours of the Mountaines, who were invited unto it, by the infinite Flight of Birds, that came up to the high Grounds, while the Waters stood below. So you see, by this maine Accident of Time, wee lost our Traffique with the Americans, with whom, of all others, in regard, they lay nearest to us, wee had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether, it were in respect of Warres, or by a naturall Revolution of Time,) Navigation did every where greatly decay ; And specially, farre Voyages, (the rather by the Use of Gallies, and such Vessells as could hardly brooke the Ocean) were altogether left and omitted. So then, that Part of Entercourse, which could bee from other Nations, to Sayle to us ; you see how it hath long since ceased ; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought bee by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truelie,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Navigation, is as great as ever ; And therefore

therefore why we should sit at home, I shall now give you an account by it selfe ; And it will draw Nearer, to give you satisfaction, to your principall Question.

There raigned in this Island, about 1900. yeares agoe, a King, whose memory of all others we most adore ; Not Superstitiously, but as a Divine Instrument, though a Mortall Man : His Name was Salomona : And wee esteeme him as the Law-giver of our Nation. This King had a large heart, inscrutable for good ; and was wholly bent to make his Kingdome and People Happy. He therefore taking into Consideration, how sufficient and substantive this Land was, to maintaine it selfe without any ayd (at all) of the Forrainer ; Being 5600. Mile in Circuit, and of rare Fertility of Soyle, in the greatest part thereof ; And finding also the Shipping of this Countrey mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling unto some small Islands that are not farre from us, and are under the Crowne and Laws of this State ; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was ; So as it mought be a thousand wayes altered to the worse, but scarce any one way to the better ; thought nothing wanted to his Noble and Heroicall Intentions, but one-ly (as farre as Hmane foresight mought reach) to give perpetuity to that, which was in his time so happily established ; Therefore amongst his other Fundamentall Lawves of this Kingdome, he did ordaine, the Interdicts and Prohibitions, which we have touching Entrance of Strangers ; which at that time (though it was after the Calamity of America) was frequent ; Doubting Novelties, and Commixture of Manners. It is true, the Like Law, against the Admission of Strangers without License, is an ancient Law, in the Kingdom of China, and yet continued in use. But there it is a poor Thing ; And hath made them a curious, ignorant, fearefull foolish Nation. But our Law-giver made his Law of another temper. For first, he hath preserved all points of Humanity, in taking Order, and making Provision for the Reliefe of Strangers distressed ; whereof you have tasted. At wick Speech (as reason was) we all rose up, and bowed our selves. He Went on. That King also still desiring to joyne Humanity and Policy together ; And thinking it against Humanity, to detaine Strangers here against their wills ; And against Policy, that they should returne, and discover their knowledge of this Estate, he took this Course : Hee did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as many as would ; But as many as would stay, should have very good Conditions, and Meanes to live,

from the State. Wherein he saw so farre, that now in so many Ages since the Prohibition, we, have memory, not of one Ship that ever returned, and but of thirteen Persons onely, at severall times, that chose to returne in our Bottomes. What those few that returned, may have reported abroad, I know not. But you must thinke, Whatsoever they have said, could be taken where they came, but for a Dreame. Now for our Travelling from hence into Parts abroad, our Law-giver thought fit, altogether to restraine it. So is it not in China. For the Chineses saile were they will, or can; which sheweth, that their Law of keeping out Strangers, is a Law of Pusillanimity and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preserving the good which commeth by communicating with Strangers, and avoiding the Hurt: And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Ye shall understand, (my deare friends,) that amongst the Excellent Acts of that King, one above all hath the prebeminence. It was the Erektion, and Institution of an Order, or Societie, which we call Salomons House; The Noblest Foundation, (as wee thinke,) that ever was upon the Earth: And the Lanthorne of this Kingdome. It is dedicated to the Study of the Workes and Creatures of GOD. Some thinke it beareth the Founders Name a little corrupted, as if it should be Solamon's House. But the Records write it, as it is spoken. So as I take it to be denominate of the King of the Hebrewes, which is famous with you, and no strangers to us; For wee have some Parts of his Workes, which with you are lost; Namely that Naturall History, which he wrote of all plants, from the Cedar of Libanus, to the Mosse that groweth out of the Wall. And of all things that have Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize, in many things, with that King of the Hebrewes (which lived many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this Order or Society is sometimes called Salomons House; And sometimes the Colledge of the Sixe Dayes Workes; whereby I am satisfied, That our Excellent King had learned from the Hebrewes, That GOD had created the World, and all that therein is, within sixe Dayes; And therefore he instituted that House, for the finding out of the true Nature of all Things (whereby GOD mought have the more Glory in the Workmanship of them, and Men the More fruit in their Use of them,) did give it also that second Name. But now to come to our present purpose. When the King had forbidden, to all his People, Navigation

gation into any Part, that was not under his Crowne, he made nevertheless this Ordinance; That every twelve yeares there should be set forth, out of this Kingdome, two Ships, appointed to severall Voyages; That in either of these Ships, there should be a Mission of three of the Fellowes, or Brethren of Solomons House; whose Errand was onely to give us Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring unto us, Bookes, Instruments, and Paternes, in every kinde: That the Shippes, after they had landed the Brethren, should returne; And that the Brethren should stay abroad till the new Mission, The Ships are not otherwise fraught than with store of Victuals, and good Quantity of Treasure to remaine with the Brethren, for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the vulgar sort of Marriners are contained from being discovered at Land: And how they that must be put on shore for any time, colour themselves under the Names of other Nations; And to what places these voyages have beene designed; And what places of Rendezvous are appointed for the new Missions; And the like circumstances of the Practique; I may not doe it; Neither is it much to your desire. But thus you see we maintaine a Trade, not for Gold, Silver, or Jewels; Nor for Silks; Nor for Spices; Nor any other commodity of Matter; But onely for Gods first Creature, which was Light: To have Light (I say) of the growth of all Parts of the World. And when hee had said this, he was silent; And so were we all. For indeed we were all astonished; to heare so strange things so probably told. And he perceiving that we were willing to say somewhat, but had it not ready, in great Courtesie tooke us off, and descended to ask us Questions of our Voyage and Fortunes, and in the end concluded that wee mought doe well, to thinke with our selves, what time of stay we would demand of the State; And bade us not to scant our selves: For he would procure such time as wee desired. Whereupon we all rose up and presented our selves to kisse the skirt of his Tippet, but he would not suffer us; and so tooke his leave. But when it came once amongst our People, that the State used to offer Conditions to Strangers, that would stay, we had work enough to get any of our Men to looke to our Ship; And to keep them from going presently to the Governour, to crave conditions. But with much ado we refrained them, till wee mought agree what course to take.

We

Wee tooke our selves now for freemen, seeing there was no danger of our utter Perdition ; And lived most joyfully, going abroad, and seeing what was to be seene, in the Citie and places adjacent, within our *Tedder* ; And obtaining acquaintance with many of the Citie, not of the meanest Qualitie ; at whose hands wee found such Hmanitie, and such a freedome and desire to take Strangers, as it were, into their Bosome, as was enough to make us forget all that was deare to us, in our owne Countries : And continually we met with many things, right worthy of Observation, and Relation : As indeed, if there be a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feast*, of the *Family*, as they call it. A most Naturall, Pious, and Reverend Custome it is, shewing that Nation to be compounded of all goodnesse. This is the manner of it. It is granted to any man, that shall live to see thirty Persons, descended of his Body, alive together, and all above three yeares old, to make this *Feast*, which is done at the cost of the State. The *Father* of the *Family*, whom they call the *Tirsan*, two dayes before the *Feast*, taketh to him three of such Friends as he liketh to chuse ; And is assisted also by the Governour of the City, or Place, where the *Feast* is celebrated ; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two daies the *Tirsan* sitteth in consultation, concerning the good Estate of the *Family*. There, if there be any Discord or Suites between any of the *Family*, they are compounded and appeased. There, if any of the *Family* be distressed or decayed, order is taken for their Reliefe, and competent meanes to live. There, if any be subject to vice, or take ill Courses, they are reprov'd, & Ceusured. So likewise, Direction is given touching Marriages, and the courses of life, which any of them should take, with divers other the like Orders and Advices. The Governour assisteth to the end, to put in Execution, by his Publike Authority, the Decrees and orders of the *Tirsan*, if they should be disobeyed, Though that seldome needeth ; Such Reverence and obedience they give, to the Order of Nature. The *Tirsan* doth also then, ever chuse one Man from amongst his Sonnes, to live in House with him : Who is called, ever after, the *Sonne of the Vine*. The Reason will hereafter appeare. On the *Feast* day, the *Father*, or *Tirsan* commeth forth after Divine Service into a large Roome where the *Feast* is celebrated ; Which Roome hath an Halfe-

Pace at the upper end. Against the wall, in the middle of the Halfe-Pace, is a Chaire placed for him, with a Table and Carpet before it. Over the Chaire is a State, made Round or Ovall, and it is of Ivy; An Ivy somewhat whiter then ours, like the leafe of a Silver Aspe, but more shining; For it is Greene all winter. And the State is curiously wrought with Silver and Silke of divers Colours, broiding or binding in the Ivy; And is ever of the worke, of some of the Daughters of the Family; And veiled over at the Top, with a fine Net of Silk and Silver. But the Substance of it is true Ivy; whereof, after it is taken downe, the Friends of the Family are desirous to have some Leafe or Sprig to keep. The *Tirfan* cometh forth with all his Generation or Linage, the Males before him, and the Females following him; And if there be a Mother, from whose Body the whole Linage is descended, there is a Traverse placed in a Loft above on the right hand of the Chaire, with a privy Dore, and a carved Window of Glasse, leaded with Gold and Blew; where she sitteth, but is not seene. When the *Tirfan* is come forth, he sitteth down in the Chaire; And all the Linage place themselves against the Wall, both at his Backe, and upon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and stand upon their Feet. When he is set, the Roome being alwayes full of Company; but well kept, and without Disorder: after some pause there cometh in from the lower end of the Roome, a *Taratan*, (which is as much as an Herald) And on either side of him two *young Lads*; Whereof one carrieth a Scrowle of their shining yellow Parchment; And the other a cluster of Grapes of Gold, with a long foot or Stalke. The Herald, and Children, are clothed with Mantles of Sea-water Greene Sattin; But the Herald's Mantle is streamed with Gold, and hath a Traine. Then the Herald with three Curtesies, or rather Inclinations cometh up as farre as the Halfe-pace; And there first taketh into his Hand the Scrowle. This Scrowle is the Kings Charter, containing Gift of Revenew, and many Privileges, Exemptions, and Points of Honour, granted to the Father of the Family; And it is ever stiled and directed; *To such an one, Our wellbeloved Friend and Creditour*: Which is a Title proper onely to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subjects, The Seale set to the Kings Charter, is the Kings Image, Imbossed or moulded in Gold; And though such Charters be expedited of Course, and

as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirfan*, standeth up, supported by two of his *Sonnes*; such as he chooseth. Then the *Herald* mounteth the Halfe-Pace, and delivereth the *Charter* into his Hand: And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happy are the People of Bensalem*. Then the *Herald* taketh into his Hand from the other Child, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne set on the Top; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Top. The Grapes are in number as many as there are Descendants of the *Family*. This Golden Cluster, the *Herald* delivereth also to the *Tirfan*; who presently delivereth it over, to that Son, that he had formerly chosen, to be in House with him: Who beareth it before his *Father*, as an ensigne of Honour, when he goeth in publike ever after; And is therupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirfan* retireth; And after some time commeth forth againe to Dinner, where hee sitteth alone under the State, as before; And none of his Descendants sit with him, of what Degree or Dignity so ever, except he hap to be of *Salomons House*. He is served onely by his owne Children, such as are Male; who performe unto him all service of the Table upon the knee; And the Women onely stand about him, leaning against the wall. The Roome below his Halfe-pace, hath Tables on the sides for the Guests that are bidden; who are served with great and comely order; And towards the end of Dinner (which in the greatest Feasts with them, lasteth never above an Houre and a half) there is an *Hymne* sung, varied according to the Invention of him that composeth it; (for they have excellent Posie,) But the Subject of it is (alwayes) the praises of *Adam*, & *Noah*, and *Abraham*; Wherof the former two Peopled the World, and the last was the *Father* of the Faithfull: concluding ever with a Thanksgiving for the *Nativity* of our *Saviour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirfan* retireth againe; And having withdrawne himselfe alone into a place; where he maketh some private Prayers, he commeth forth the third time, to give the Blessing;

sing ; with all his descendants, who stand about him as at the first. Then he calleth them forth by one and by one, by name, as he pleaseth, though seldome the Order of Age be inverted. The person that is called, (the Table being before removed,) kneeleth down before the Chair, and the *Father* layeth his Hand upon his Head, or her Head, and giveth the Blessing in these words ; *Sonne of Bensalem, (or Daughter of Bensalem,) thy Father saith it ; The Man by whom thou hast Breath and Life speaketh the word ; The blessing of the Everlasting Father, the Prince of Peace, and the Holy Dove be upon thee, and make the dayes of thy Pilgrimage good and many.* This he saith to every of them ; And that done, if there be any of his Sonnes, of eminent Merit and Verue, (so they be not above two,) he calleth for them again; and saith, laying his Arme over their shoulders, they standing; *Sonnes, it is well you are borne, give God the praise, and persevere to the end.* And withall delivereth to either of them a Jewell, made in the Figure of an Ear of Wheate, which they ever after weare in the front of their Turban, or Hatt, This done, they fall to Musicke and dances, and other recreations, after their manner, for the rest of the day. This is the full order of that *Feast.*

By that time, six or seven Dayes were spent, I was fallen into straight Acquaintance, with a *Merchant* of that *Citie*, whose Name was *Joabin*. He was a *Jew* and *Circumcised*: For they have some few stirps of *Jewes*, yet remaining among them, whom they leave to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the *Jewes* in other parts. For whereas they hate Name of *CHRIST*; and have a secret inbred Rancour against the People amongst whom they live; these (contrariwise) give unto our *SAVIOUR* many high Attributes, and love the *Nation* of *Bensalem*, extremely. Surely this Man, of whom I speak, would ever acknowledge, that *CHRIST* was borne of a *Virgin*; and that he was more then a Man; And he would tell how *GOD* made him Ruler of the *Seraphims*, which guard his Throne; And they call him also the *Milken way*, and the *Eliab* of the *Messiah*; and many other high Names; which though they be Inferiour to his Divine Majesty, yet they are farre from the Language of other *Jewes*. And for the Countrey of *Bensalem*, this Man would make no end of commending it, Being desirous by Tradition among the *Jews* there, to have it beleaved, that the

People thereof were of the Generations of *Abraham*, by another Son, whom they call *Nachoran*; And that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now use; And that when the *Messias* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Jewish* Dreames, the Man was a wise Man, and learned, and of great Policy, and excellently seene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast of the Family*; For that (me thought) I had never heard of a Solemnity, wherein Nature did so much preside. And because Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage; and whether they kept Marriage well; and whether they were tyed to one Wife? For that where Population is so much affected, and such as with them it seemed to be, there is commonly permission of *Plurality of Wives*. To this he said; *You have Reason for to commend that excellent Institution of the Feast of the Family; And indeed we have Experience, that those Families that are partakers of the Blessings of that Feast, doe flourish and prosper ever after, in an extraordinary manner. But heare me now, and I will tell you what I know. You shall understand, that there is not under the Heavens so chaste a Nation, as this of Bensalem; Nor so free from all Pollution or foulness. It is the Virgin of the World, I remember, I have reade in one of your European Bookes, of an holy Hermit amongst you, that desired to see the Spirit of Fornication, and there appeared to him, a little foule ugly Aethiope: But if he had desired to see the Spirit of Chastitie of Bensalem, it would have appeared to him, in the likenesse of a faire beautifull Cherubine. For there is nothing, amongst Mortall Men, more faire and admirable, than the Chaste Mindes of this People. Know therefore, that with them there are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kinde. Nay they wonder (with detestation) at you in Europe, which permit such things. They say ye have put Marriage out of office: For Marriage is ordained a Remedie for unlawfull Concupiscence; And Naturall Concupiscence seemeth as a spurre to Marriage. But when Men have at hand a Remedy, more agreeable to their corrupt will, Marriage is almost expelled. And therefore there are with you seene*
infinite

infinite Men, that marry not, but chuse rather a libertine and impure single Life, than to be yoked in Marriage ; And many that doe marry, marry late, when the Prime and Strength of their Yeares is past. And when they doe marry, what is Marriage to them, but a very Bargaine ; Wherein is sought Alliance, or Portion, or Reputation, with some desire (almost indifferent) of Issue ; And not the faithfull Nuptiall Vnion of Man and Wife, that was first instituted. Neither is it possible, that those that have cast away so basely, so much of their Strength, should greatly esteeme Children, (being of the same Matter,) as chaste Men doe. So likewise during Marriage is the Case much amended, as it ought to be if those things were tolerated onely for necessitie ; No, but they remaine still as a very affront to Marriage. The Haunting of those dissolute places, or resort to Curtezans, are no more punished in Married Men, than in Batchelers. And the depraved Custome of Change, and the delight in Meretricious Embracements, (where sinne is turned into Art,) maketh marriage a dull thing, and a kinde of Imposition, or Taxe. They heare you defend these things ; as done to avoid greater Evills ; As Advontries, Deflowering of Virgins, Vnnaturall lust, and the like. But they say, this is a preposterous Wisdome ; and they call it Lots offer who to save his Guests from abusing, Offered his Daughters : Nay they say further, That there is little gained in this ; For that the same Vices and Appetites, doe still remaine and abound, Unlawfull Lust being like a Furnace, that if you stop the Flames altogether, it will quench, but if you give it any vent, it will rage ; As for Masculine love, they have no touch of it ; And yet there are not, so faithfull and inviolate Friendships, in the World againe, as are there ; And to speake generally, (as I said before,) I have not read of any such Chastity, in any People, as theirs. And their usuall saying is, That whosoever is unchaste cannot reverence himselfe : And they say, That the reverence of a Mans selfe, is, next Religion, the chiefeest bridle of all Vices. And when he had said this, the good Jew paused a little ; Whereupon, I farre more willing to heare him speake on, than to speake my selfe ; yet thinking it decent, that upon his pause of Speech, I should not be altogether silent, said onely this ; That I would say to him, as the Widow of Sarepta said to Elias ; That hee was come to bring to Memorie our Sinnes ; And that I confesse the Righteousnesse of Bensalem, was greater than the Righteousnesse of Europe. At which speech he bowed his Head, and went on this manner. They have also many wise and excellent Lawes touching Marriage,

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They

They allow no Polygamie. They have ordained that none doe intermarry, or contract, untill a Moneth be past from their first inter-view. Marriage without consent of Parents they doe not make void, but they mulct it in the Inheritors: For the Children of such Marriages, are not admitted to inherit, above a third Part of their Parents Inheritance. I have read in a Book of one of your Men, of a Feigned Common-Wealth, where the Married couple are permitted, before they Contract, to see one another Naked. This they dislike: For they thinke it a Scorne, to give a Refusall after so familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they have a more Civill way: for they have neare every Towne, a Couple of Pooles, (which they call Adam and Eves Pooles) where it is permitted to one of the friends of the Man, and another of the friends of the Woman, to see them severally bath Naked

And as wee were thus in Conference, there came one that seemed to be a Messenger, in a rich Huke, that spake with the Jew: whereupon he turned to me, and said; You will pardon me, for I am commanded away in haste. The next Morning he came to me againe, joyfull, as it seemed, and said; There is word come to the Governour of the Citie, that one of the Fathers of Salomons House, will be here this day Seven-night: Wee have seene none of them this Dozen Yeares. His Comming is in State; But the cause of his Comming is secret. I will provide you, and your Fellowes, of a good standing to see his Entry. I thanked him, and told him; I was most glad of the Newes. The day being come he made his Entry. He was a Man of middle Stature, and age, comely of person, and had an Aspect as if he pittied Men. He was cloathed in a Robe of fine blacke Cloth, with wide Sleeves, and a Cape. His under Garment was of excellent white Linnen downe to the Foot, girt with a girdle of the same; And a Sindon or Tippet of the same about his Neck. He had Gloves, that were curious, and set with Stone; And Shoes of Peach-coloured Velvet. His Necke was bare to the Shoulders. His Hat was like a Helmet, or Spanish Montera; And his locks curled below it decently: They were of Colour browne. His Beard was cut round, and of the same colour with his Haire, somewhat lighter. Hee was carried in a rich Charriot, without wheelles, Litter-wise, With two Horses at either end, richly trapped in blew Velvet Embroydered; and two Footmen on each side in the like attire. The Charriot was all of Cedar, gilt and adorned with Christall; Save that the Fore-end had Pannesl

Pannells of Sapphires, set in borders of Gold, and the Hinder-end the like of Emerauds of the *Pern* Colour. There was also a Sunne of Gold, Radiant upon the Top, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings displayed. The Charriot was covered with cloth of Gold tissued upon Blew. He had before him fifty attendants, young Men all, in white *Satten* loose Coats up to the Mid Leg, and Stockings of white Silk; and Shoos of blew Velvet; and Hats of blew Velvet; with fine Plumes of divers Colours, set round like Hat-bands. Next before the Chariot, went two Men, bare headed, in Linnen garments downe to the foot, girt, and Shoes of blew Velvet; who carried the one a Crofier, the other a Pastorall Staffe like a Sheepe-hooke; Neither of them of Metall, but the Crofier of Balme-wood, the Pastorall staffe of Cedar. Horse-Men he had none, neither before, nor behind his Charriot: As it seemeth, to avoid all Tumult and trouble. Behinde his Chariot, went all the Officers and Principalls of the Companies of the Citie. He sate alone, upon Cushions, of a kinde of excellent Plush, blew; And under his Foot curious Carpets of Silke of divers Colours, like the Persian, but farre finer. He held up his Bare Hand, as he went, as blessing the people, but in Silence. The Street was wonderfully well kept; So that there was never any Army had their Men stand in better Battell-Array, than the People stood. The windows likewise were not crouded, but every one stood in them, as if they had beene placed. When the shew was past, the Jew said to me; *I shall not be able to attend you as I would, in regard of some Charge the Cittie hath laid upon me for the Entertaining of this great Person.* Three dayes after the Jew came to me againe, and said; *Ye are happy Men; For the Father of Salomons House taketh knowledge of your being here, and commanded me to tell you, that he will admit all your Company to his presence, and have private Conference with one of you, that yee shall chosse: And for this hath appointed the next day after to Morrow.* And because he meareth to give you his Blessing, he hath appointed it in the Fore-Noone. We came at our Day, and Houre, and I was cholen by my Fellowes for the private access. We found him in a faire Chamber, richly hanged, and carpetted under Foot, without any Degrees to the State, he was set upon a Low Throne richly adorned, and a rich cloth of State over his head of blew Sattin Embroidered. He was alone, save that he had two pages of Honour, on either Hand one, finely attired in White

White. His Under Garments were the like that we saw him weare in the Chariot ; But in stead of his Gowne, he had on him a Mantle with a Cape, of the same fine Blacke, fastened about him. When wee came in, as wee were taught, we bowed Low at our first Entrance ; And when wee were come neare his Chaire, he stood up, holding forth his Hand ungloved, and in Posture of Blessing ; And we every one of us stooped downe, and kissed the Hemme of his Tippet. That done, the rest departed, and I remained. Then he warned the Pages forth of the Roome, and caused me to sit downe beside him, and spake to me thus in the *Spanish Tongue*.

GOD blesse thee, my Sonne ; I will give thee the greatest Jewell I have. For I will impart unto thee, for the love of GOD and Men, a Relation of the true State of Salomons House. Son, to make you know the true state of Salomons House, I will keepethis order. First I will set forth unto you the End of our Foundation. Secondly, the Preparations and Instruments we have for our Works. Thirdly, the severall Employments and Functions whereto our Fellowes are assigned. And fourthly the Ordinances and Rites which we observe.

The End of our Foundation is the Knowledge of Causes, and Secret Motions of things ; and the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible.

The Preparations and Instruments are these. We have large and deep Caves of severall Depths : The deepest are sunke 600. Fathome: And some of them are digged and made under great Hills and Mountaines : So that if you reckon together the Depth of the Hill, and the Depth of the Cave, they are (some of) them above three Miles deep. For we finde, that the Depth of an Hill, and the Depth of a Cave from the Flat, is the same Thing ; both remote a like, from the Sunne and Heavens Beams, and from the open Aire. These Caves we call the Lower Region. And we use them for all Coagulations, Indurations, Refrigerations, and Conservations, of Bodies. We use them likewise for the Imitation of Naturall Mines ; And the Producing, also of New Artificiall Mettals, by Compositions and Materials which we use and lay there for many yeares. We use them also sometimes, (which may seeme strange) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to live there, well accomodated of all things necessary, and indeed live very long ; By whom also we learne many things.

We have Burialls in severall Earths, where we put divers Cements,

ments, as the Chineses, doe their Porcellane. But we have them in greater Varietie, and some of them more fine. We also have great variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

We have High Towers; The Highest about halfe a Mile in Height; And some of them likewise set upon High Mountaines : So that the Vantage of the Hill with the Tower, is in the Highest of them three Miles at least. And these Places we call the Vpper Region; Account the Aire betweene the High Places, and the Low, as a Middle Region. We use these Towers, according to their severall Heights, and Situations, for Insolation, Refrigeration, Conservation, And for the View of divers Meteors ; As Windes, Raine, Snow, Haile; And some of the Fiery Meteors also. And upon them, in some Places, are Dwellings of Hermits, whom we visit sometimes, and instruct what to observe.

We have great Lakes both Salt, and Fresh, whereof we have use for the Fish, and Fowle. We use them also for Burialls, of some Naturall Bodies : For we finde a difference in things buried in Earth, or in Aire below the Earth ; and things buried in VWater. We have also Pooles, of which some doe straine Fresh VWater out of Salt; And others by Art doe turne Fresh VWater into Salt. We have also some Rocks in the Midst of the Sea ; And some Bayes upon the Shore for some VVorks, wherein is required the Aire and Vapour of the Sea. We have likewise violent Streames and Cataracts, which serve us for many Motions : And likewise Engines for Multipling and Enforcing of Windes, to set also on going divers Motions.

We have also a Number of Artificiall Wells and Fountaines, made in Imitation of the Naturall Sources and Bathes ; As tinged upon Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, and other Mineralls : And againe; wee have little Wells for Infusions of many Things, where the Waters take the Vertue quicker and better, than in Vessels, or Basins. And amongst them we have a Water, which we call water of Paradise, being, by that we doe it, made very Sovereigne for Health and Prolongation of Life.

We have also Great and spacious Houses, where we imitate and demonstrate Meteors ; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of Water, thunders, Lightnings ; Also Generations of Bodies, in Aire ; As Frogs, Flies, and diverse Others.

We have also certaine Chambers, which we call Chambers of Health, where we qualifie the Aire as we thinke good and proper for the Cure of divers Diseases, and Preservation of Health.

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We have also faire and large Baths, of severall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: And others for the Confirming of it in strength of Sinews, vitall Parts, and the very Juyce and Substance of the Body.

We have also large and various Orchards, and Gardens; Wherein we do not so much respect Beauty, as Variety of Ground and Soile, proper for divers Trees and Herbes: And some very spacious, where Trees and Berries are set, whereof we make divers Kindes of Drinks, besides the Vine-yards. In these we practise likewise all Conclusions of Grafting, and Inoculating, as well of Wilde-Trees, as Fruit-Trees, which produceth many Effects. And we make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier or later than their Seasons; And to come up and beare more speedily than by their Naturall Course they doe. We make them also by Art greater much than their Nature; And their Fruit greater, and sweeter, and of differing Taste, Smell, Colour, and Figure, from their Nature. And many of them we so Order, as that they become of Medicinall Use.

We have also Meanes to make divers Plants, rise by Mixtures of Earths without Seeds; And likewise to make divers New Plants, differing from the Vulgar; and to make one Tree or Plant turne in to another.

We have also Parkes, and Enclosures of all Sorts, of Beasts, and Birds; which we use not onely for view or Rarenesse, but likewise for Dissections and Trials; That thereby may take light, what may be wrought upon the Body of Man. Wherein we finde many strange Effects; As Continuing Life in them, though divers Parts, which you account Vitall, be perished, and taken forth; Resuscitating of some that seeme Dead in Appearance; And the like. We try also all Poysons, and other Medicines upon them, as well of Chirurgery, as Physicke. By Art likewise, we make them Greater, or Taller, than their Kinde is; And contrarywise Dwarfse them and stay their Growth: Wee make them more Fruitfull, and Bearing than their Kinde is; And contrary-wise Barren and not Generative. Also we make them differ in Colour, Shape, Activity, many wayes. We finde Meanes to make Commixtures and Copulations of diverse Kindes; which have produced many New Kinds, and them not Barren, as the generall Opinion is. We make a number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction; whereof some are advanced (in effect) to be Perfect Creatures, like Beasts, or Birds; And have Sexes, and do Propagate. Neither doe we this by Chance, but we know before hand, of what Matter and Commixture, what Kinde of those Creatures Will arise.

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We have also Particular Pooles, where we make Trialls upon Fishes, as we have said before of Beasts and Birds.

We have also Places for Breed and Generation of those Kindes of Wormes, and Flies, which are of Speciall Use; such as are with you your Silkwormes and Bees.

I will not hold you long with recounting of our Brew-houses, Bake-houses, and Kitchens, where are made divers Drinkes, Breads, and Meats, Rare and of speciall Effects. Wines we have of Grapes; And Drinkes of other Juyce, of Fruits, of Graines, and of Rootes; And of Mixtures with Honey, Sugar, Manna, and Fruits dryed and decocted: Also of the Teares or Woundings of Trees; And of the Pulp of Canes. And these Drinks are of Severall Ages, some to the Age or Last of forty yeares. We have Drinks also brewed with severall Herbs, and Roots, and Spices; Tea, with severall Fleashes, and White-Meats; whereof some of the Drinkes are such as they are in effect Meat and Drinke both: So that Divers, especially in Age, doe desire to live with them, with little or no Meat, or Bread. And above all we strive to have Drinks of Extreame Thinne Parts; To insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting; Insomuch as some of them put upon the Back of your Hand, will, with a little stay passe thorow to the Palme, and yet taste Mild to the Mouth. We have also Waters, which we ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drinke; And many will use no other. Breads we have of Severall Graines, Roots, and Kernels; Tea, and some of Flesh, and Fish, Dried; With divers kinds of Leavings, and Seasonings: So that some doe extreamely move Appetites; Some doe nourish so, as Divers doe live of them, without any other Meat; Who live very long. So for Meats, we have some of them so beaten, and made Tender, and mortified, yet without all Corrupting, as a Weake Heat of the Stomacke will turne them into good Chilus; As well as a Strong Heat would Meat otherwise prepared. We have some Meats also and Breads, and Drinkes, which taken by Men, enable them to Fast long after; and some other, that used make the very Flesh of Mens Bodies, sensibly more Hard and Tough; And their Strength farre greater, then otherwise it would be.

We have Dispensatories, or Shops of Medicines. Wherein you may easily thinke, if we have such Varietie of Plants, and Living Creatures, more then you have in Europe, (for we know what you have,) the Simples, Drugges, and Ingredients of Medicines, must likewise be in so much the greater Varietie. We have them likewise

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of divers Ages, and long Fermentations. And for their Preparations, we have not onely all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heats, and Percolations through divers Strainers, yea, and Substances; But also exact Formes of Composition, whereby they incorporate almost as they were Naturall Simples.

We have also divers Mechanicall Arts, which you have not; And Stuffs made by them; As Papers, Linnen, Silkes, Tissues; dainty Workes of Feathers of wonderfull Lustre; excellent Dies, and manie others: And Shops likewise as well for such as are not brought into Vulgar use amongst us, as for those that are. For you must know, that of the Things before recited, manie of them are growne into use throughout the Kingdome; But yet, if they did flow from our Invention, we have of them also for Patternes, and Principalls.

We have also Furnaces of great Diversities, and that keepe great Diversitie of Heats: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Drie, Moist; And the like. But above all we have Heats, in Imitation of the Sunnes and Heavenly Bodies Heats, that passe divers inequalities, and (as it were) Orbs, Progresses, and Returnes, whereby we produce admirable effects. Besides, we have Heats of Dung; and of Bellies and Mawes of Living Creatures and of their Bloods, and Bodies; and of Hayes and Herbs laid up moist; of Lime unquenched; and such like. Instruments also which generate Heate onely by Motion. And further, Places for Strong Insolations; And againe, Places under the Earth, which by Nature, or Art yeeld Heate. These divers Heats we use, As the Nature of the Operation which we intend, requireth.

We have also Perspective-Houses, where we make Demonstrations of all Lights, and Radiations: And of all Colours: And out of Things uncoloured and Transparent, we can represent unto you all severall Colours; Not in Rain-bowes, (as it is in Gemmes, and Prismes,) but of themselves Single. We represent also all Multiplications of Light, which we carry to great Distance: and make so Sharpe, as to discern small points and Lines. Also all Colourations of Light, All Delusions and Deceits of the Sight, in Figures, Magnitudes, Motions, Colours: All Demonstrations of Shadowes. Wee finde also divers Meanes yet unknowne to you, of Producing of Light, originally, from divers Bodies. We procure meanes of Seeing Objects A-farre off; As in the Heaven, and Remote places: And represent Things Neare as A-farre off; And Things A-farre off as Neare; Making Faigned Distances. We have also Helpes for
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the Sight farre above Spectacles and Glasse in use; VVe have also Glasse and Meanes to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Wormes, Graines, and Flawes, in Gemmes, which cannot otherwise be seene, Observations in Urine and Bloud not otherwise to be seene. VVe make Artificiall Rain-Bowes, Helo's, and Circles about Light. We represent also all manner of Reflexions, Refractions, and Multiplications of Visuall Beames of Objects.

VVe have also Pretious Stones, of all kindes, many of them of great Beantie and to you unknown: Christalls likewise; And Glasse of divers kinds; And amongst them some of Metals Vitricated, and other Materials, besides those of which you make Glasse. Also a number of Fossiles, and Imperfect Mineralls which you have not. Likewise Loadstones of Prodigious Vertue: And other rare Stones, both Naturall and Artificiall.

Wee have also Sound Houses, where we practise and demonstrate all Sounds, and their Generation. We have Harmonies which you have not, of Quarter-Sounds, and lesser Slides of Sounds. Diverse Instruments of Musicke likewise to you unknowne, some sweeter than any you have; With Bells and Rings that are dainty and sweet. VVe represent small sounds as gerat and Deepe; Likewise Great sounds, Extenuate and sharpe; VVe make diverse tremblings and Warblings of Sounds, which in their Originall are Entire. VVe represent and imitate all Articulate sounds and Letters, and the Voices and Notes of Beasts and Birds. VVe have certaine Helps, which set to the Eare doe further the Hearing greatly. VVe have also diverse strange and Artificiall Eccho's Reflecting the Voice many times, and as it were tossing it: And some that give backe the Voice Lowder than it came, some shriller and some Deeper; Yea some rendering the Voice, Differing in the Letters or Articulate Sound, from that they receive. VVe have all meanes to convey sounds in Trunks and Pipes, in strange Lines and Distances.

VVe have also Perfume-houses; wherewith we joyne also Practises of Taste. We Multiply smells, which may seeme strange We Imitate smells, making all smells to breath out of other Mixtures than those that give them. We make diverse Imitations of Taste likewise, so that they will deceive any Mans Taste. And in this House we containe also a Confiture-House; where we make all Sweet-Meats, Drie and Moist; And divers pleasant Wines, Milks, Broaths, and Sallets, farre in greater Varietie then you have.

We have also Engine-Houses, where are prepared Engines and

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Instruments for all Sorts of Motions. There we imitate and practise to make Swifter Motions, than any you have, either out of your Muskets, or any Engine that you have: and to Make them, and Multiply them more Easily, and with Small Force, by Wheelles and other Meanes: and to make them Stronger, and more Violent, than yours are; Exceeding your greatest Cannons and Basilisks. We represent also Ordnance and Instruments of Warre, and Engines of all Kindes: and likewise new Mixtures and Compositions of Gunne-Powder, Wilde-Fires burning in Water, and Unquenchable. Also Fire-Workes of all Variety both for Pleasure, and Use. We imitate also Flights of Birds; We have some Degrees of Flying in the Ayre. We have Ships and Boats for Going under Water, and Brooking of Seas; Also Swimming-Girdles and Supporters. We have divers curious Clocks; And other like Motions. of Returne: And some Perpetuall Motions. We imitate also Motions of Living Creatures, by Images of Men, Beasts, Birds, Fishes, and Serpents; We have also a great Number of other Various Motions, strange for Equality, Finenesse, and Subtility.

We have also a Mathematicall-House, where are represented all Instruments, as well of Geometry, as Astronomy, exquisitely made.

We have also Houses of Deceits of the Senses; where we represent all manner of Feats of Jugling, False Apparitions, Impostures, and Illusions; And their Fallacies. And surely you will easily beleeve, that we, that have so many Things truly Naturall which induce Admiration, could in a World of Particulars deceive the Senses, if wee would disguise those Things, and labour to make them more Miraculous. But we doe hate all Impostures, and Lies: Insomuch as we have severely forbidden it to all our Fellowes, under paine of Ignominy and Fines, that they doe not shew any Naturall Worke or Thing, Adorned or Swelling; but onely Pure as it is, and without all Affectation of Strangenesse.

These are (my Sonne) the riches of Sallomons House.

For the severall Employments and Offices of our Fellowes; We have Twelve that Sayle into Forraine Countries under the Names of other Nations, (for our owne we conceale;) Who bring us the Bookes and Abstracts, and Patternes of Experiments of all other Parts; These we call Merchants of Light.

Wee have Three that Collect the Experiments which are in all Bookes, These we call Deprepators.

Wee have Three that Collect the Experiments of all Mechanicall

call Arts; And also of Liberall Sciences; And also of practises which are not Brought into Arts. These we call Mystery-men.

We have Three that trie New Experiments.

Such as themselves thinke good. These we call Pioneers or Miners.

We have Three that Draw the Experiments of the Former Four into Titles, and Tables, to give the better light for the drawing of Observations and Axiomes out of them. These we call Compilers. Wee have three that bend themselves, Looking into the Experiments of their Fellowes, and cast about how to draw out of them Things of Use, and Practise for Mans life, and Knowledge, as well for Workes as for Plaine Demonstration of Causes, Meanes of Naturall Divinations, and the easie and cleare Discoverie of the Vertues and Parts of Bodies. These we call Dowry-men or Benefactors.

Then after diverse Meetings and Consults of our whole Number, to consider of the former Labours and Collections, we have Three that take care, out of them, to Direct New Experiments, of a Higher Light, more Penetrating into Nature than the Former. These we call Lamps.

We have three others that doe Execute the Experiment, so Directed, and Report them. These we call Inoculators.

Lastly, we have three that raise the former Discoveries by Experiments, into Greater Observations, Axiomes, and Aphorismes. These wee call Interpreters of Nature.

We have also, as you must thinke, Novices and Apprentices, that the Succession of the former Employed Men doe not faile; besides a great Number of Servants and Attendants, Men and Women. And this we doe also: We have Consultations, which of the Inventions and Experiences, which we have discovered, shall be Published, and which not: And take all an Oath of Secrecie, for the concealing of those which we thinke fit to keepe Secret: Though some of those we doe reveale sometime to the State, and some not.

For our Ordinances and Rites: We have two very Long, and Faire Galleries: In one of these we place Patternes and Samples of all manner of the more Rare and Excellent Inventions: In the other we place the Statua's of all Principall Inventours. There we have the Statua of your Columbus, that discovered the West-Indies: Also the Inventour of Shippes: Your Monke that was the Inventour of Ordnance, and of Gunpowder: The Inventour of Musicke: The Inventour of Letters: The Inventour of Printing: The Inventour of Observations of Astronomy: The Inventour of Works

Works in Mettall : *The Inventour of Glasse : The Inventour of Silke of the VVorme : The Inventour of Wine : The Inventour of Corne and Bread : The Inventour of Sugars : And all these, by more certain Tradition, than you have* Then we have diuers Inventours of our Own, of Excellent VVorkes ; Which since you have not seene, it were too long to make Delcriptions of them ; And besides, in the right Understanding of those Descriptions, you might easily erre. For upon every Invention of Valew, we erect a Statua to the Inventour, and give him a Liberall and Honourable Reward. These Statua's are, some of Brasse ; some of Marble and Touchstone ; some of Cedar and other speciall VVoods gilt and adorned ; some of Iron ; some of Siver ; some of Gold.

Wee have certaine Hymnes and Services, which we say dayly, of Laud and Thankes to God for his Marveilous VVorkes : And Formes of Prayers, imploring his Aide and Blessing for the Illumination of our Labours ; the vnd turning them into Good and Holy Uses.

Lastly, we have Circuits or Visits, of diuers Principall Cities of the Kingdome ; where as it commeth to passe, we doe publish such New Profitable Inventions, as we thinke good. And we doe also declare Naturall Divinations of Diseases, Plagues, Swarmes of Hurtfull Creatures, Scarcity, Tempest, Earthquakes, Great Inundations, Comets, Temperature of the Yeare, and diuers other Things ; And we give Counsell thereupon, what the People shall doe, for the Prevention and Remedy of them.

And when He had said this, He stood up : And I, as I had beene taught, kneeled downe : and he laid his Right Hand upon my Head, and said ; G O D blesse thee my Sonne, and G O D blesse this Relation, which I have made. I give thee leave to Publish it, for the good of other Nations ; For we here are in G O D S Bosome, a Land unknowne. And so he left me ; Having assigned a valew of about two Thousand Duckets, for a Bounty to me and my Fellowes. For they give great Largeesses, where they come, upon all occasions.

The rest was not Perfected



MAGNALIA NATVRÆ
PRÆCIPVE QVOAD
USVS HVMANOS.



The Prolongation of Life.

The Restitution of Youth in some Degree.

The Retardation of Age.

The Curing of diseases counted Incurable.

The Mitigation of Paine.

More Easie and lesse Loathsome Purgings.

The Encreasing of Strength and Activity.

The Encreasing of Ability to suffer Torture or Paine.

The Altering of Complexions : and Fatnesse, and Leanness.

The Altering of Statures.

The Altering of Features.

The Encreasing and Exalting of the intellectuall Parts.

Versions of Bodies into other Bodies.

Making of New Species.

Transplanting of one Species into another.

Instruments of Destruction, as of VVarre and Poyson.

Exhilaration

Exhilaration of the Spirits, and Putting them in good Disposition.

Force of the Imagination, either upon another Body, or upon the Body it selfe.

Acceleration of Time in Maturations.

Acceleration of Time in Clarifications.

Acceleration of Putrefaction.

Acceleration of Decoction

Acceleration of Gernination.

Making Rich Composts for the Earth.

Impressions of the Aire, and Raising of Tempests.

Great Alteration ; As in Induration, Emollition, &c.

Turning Crude and VVatry Substances, into Oyly and Unctious Substances.

Drawing of New Foods out of Substances not now in Vse.

Making New Threds for Apparell ; And New Stuffles, Such as are Paper, Glasse, &c.

Naturall Divinations.

Deceptions of the Senses.

Greater Pleasures of the Senses.

Artificiall Mineralls and Cements.

FIN IS.

HISTORY NATVRALL

AND

EXPERIMENTALL,

OF

LIFE and *DEATH*.

OR

Of the Prolongation of Life.

Written in Latine by the Right Hon^{ble}
FRANCIS Lord *Verulam*, Vis-Count
Saint *ALBAN*.



LONDON,

Printed for *William Lee*, and *Humphrey Moseley*,
and are to be sold at their Shops. 1650.

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OR

Of the Prolongation of Life.

Written in Latine by the Right Hon^{ble}
FRANCIS Lord *Verulam*, Vis-Count
Saint *ALBAN*.



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TO THE READER.

I Am to give Advertisement, that there came forth, of late, a *Translation* of this *Booke*, by an unknowne PERSON; Who though he wished well to the propagating of his *Lordships Workes*, yet he was altogether unacquainted with his *Lordships Stile*, and *Manner of Expressions*; And so published a *Translation*, *Lame*, and *Defective*, in the whole. Whereupon, I thought fit, to r-commend the same, to bee translated anew, by a more *Diligent*, and *Zealous Pen*; which hath since travailed in it: And though it still comes short of that *Lively*, and *incomparable Spirit*, and *Expression*, which lived and dyed with the *Authour*; yet I dare avouch it, to bee much more warrantable, and agreeable, than the former. It is true, this *Booke* was not intended to have been published in *English*; But seeing it hath beene, alreadie, made free of that *Language*; Whatsoever Benefit, or Delight, may redound from it; I commend the same to the Courteous, and Judicious *Reader*.

W. R.



To the present Age, and Posterity Greeting.

Altough we had ranked the History of Life and Death, as the last, amongst our six Monethly Designations; yet we have thought fit, in respect of the prime use thereof; (In which the least Losse of Time ought to bee esteemed precious;) to invert that Order, and to send it forth in the second place. For wee have hope, and wish, that it may conduce to a Common Good; And that the Nobler sort of Physitians will advance their thoughts; And not employ their Times wholly in the Sordidnesse of Cures; Neither be Honoured for Necessitie only; But that they will become Coadjutors and Instruments of the Divine omnipotence and Clemencie, in Prolonging and Renewing the Life of Man; especially seeing we prescribe it to be done by Safe, and Convenient, and Civill waies, though hitherto un-assayed. For though we Christians doe continually aspire, and pant after the Land of Promise; Yet it will be a Token of Gods favour towards us, in our Journeyings throw this worlds wildernesse, to have our Shooes and Garments, (I meane, those of our Fraile Bodies) little worne, or impaired.

FR. S. ALBAN.

THE



THE HISTORY OF Life and Death.

The Preface.

I*T is an ancient Saying, and Complaint ; That Life is Short, and Art Long. Wherefore, it behooveth us, who make it our chiefest Aime, to perfect Arts ; to take upon us, the Consideration, of Prolonging Mans Life ; God the Author of all Truth, and Life, prospering our Endeavours. For though the Life of Man be nothing else, but a Masse, and Accumulation, of Sins, and Sorrows ; And they that looke for an Eternall Life, set but light by a Temporarie ; Yet the Continuation of workes of Charity, ought not to be contemned, even by us Christians. Besides, the Beloved Disciple of our Lord, survived the other Disciples ; And many of the Fathers of the Church, especially of the Holy Monkes, and Hermits, were long liv'd ; which shewes, that this Blessing of Long Life, so often promised in the old Law, had lesse Abatement after our Saviours Dayes, than other Earthly Blessings had. But to esteeme of this, as the chiefest Good, we are but too prone. Onely the Inquirie is difficult, how to attaine the same ; And so much the rather, because it is corrupted with false opinions, and vaine reports. For both, those Things, which the Vulgar Physitians talke, of Radicall Moisture, and Naturall Heate, are but meere Fictions ; And the Immoderate praises of Chymicall Medicines ; first pusse up with vaine hopes, and then faile their Admirers.*

And as for that Death, which is caused by Suffocation, Putrefaction, and severall Diseases, we speake not now ; For that pertaines to an History of Physick ; But onely of that Death which comes by a totall Decay of the Body, and the Inconcoction of old Age.

The Preface.

Nevertheless, the last Act of Death, and the very Extinguishing of Life it selfe, which may so many waies be wrought, outwardly, and inwardly; (which notwithstanding have, as it were, one common Porch, before it comes to the point of Death;) will be pertinent, to be inquired of in this Treatise; but we reserve that for the last place.

That which may be repayred by degrees, without a totall wast of the first stocke, is potentially eternall; As the Vestall Fire. Therefore, when Physitians, and Philosophers saw, that Living Creatures were nourished, and their Bodies repaired; But that this did last onely for a time; And afterwards came old Age, and, in the end, Dissolution; they sought Death in somewhat, which could not properly be repaired; Supposing a Radicall Moysture incapable of solid Reparation; And which, from the first infancie, received a Spurious Addition, but no true Reparation; whereby it grew daily worse and worse; And, in the end, brought the Bad, to None at all. This conceit of theirs, was both ignorant and vaine. For all Things, in Living Creatures, are, in their youth, repaired entirely; Nay, they are, for a time, increased in Quantity, bettered in Quality; so as the Matter of Reparation might be Eternall, if the Manner of Reparation did not faile. But this is the Truth of it: There is, in the Declining of Age, an unequall Reparation; Some Parts are repaired easily; others with Difficulty, and to their losse; So as, from that time, the Bodies of Men begin to endure the Torment of Mezentius; That the Living die in the Embraces of the Dead; And the Parts easily reparable, through their Conjunction with the Parts hardly reparable, doe decay. For the Spirits, Bloud, Flesh, and Fat, are, even after the Decline of yeares, easily repaired; But the Drier, and more Porous parts, (As the Membranes; All the Tunicles; The Sinewes, Arteries, Veines, Bones, Cartilages; Most of the Bowels; In a word, almost all the Organicall parts;) are hardly Reparable, and to their losse. Now these hardly Reparable Parts, when they come to doe their office, of Repayring the other, which are easily reparable, finding themselves deprived of their wonted Ability, and strength, cease to performe any longer, their proper Functions. By which meanes, it comes to passe, that in proçesse of time, the whole tends to Dissolution; And even those very parts, which in their owne nature, are, with much ease, Reparable; Yet through the Decay of the Organs of Reparation, can no more receive Reparation; But decline, and, in the end, utterly faile. And the cause of the Termination of Life, is this; For that the Spirits, like a gentle Flame, continual-

The Preface.

ly preying upon Bodies ; conspiring with the outward Aire, which is ever Sucking, and Drying of them ; Doe, in time, destroy the whole Fabricke of the Body ; As also the particular Engines, and Organs thereof ; And make them unable, for the worke, of Reparation. These are the true waies, of Naturall Death, well, and faithfully, to be revolved in our Mindes : For He that knowes not the wayes of Nature, how can he succour her, or turne her about.

Therefore, the Inquisition ought to be two-fold : The one touching the Consumption, or Depredation, of the Body of Man ; The other, touching the Reparation, and Renovation of the same : To the end, that the former may, as much as is possible, bee forbidden and restrained ; And the Latter, comforted. The Former of these, pertaines especially, to the Spirits, and Outward Aire : By which the Depredation, and Wast, is committed ; The Latter to the whole Race of Alimentation, or Nourishment ; whereby, the Renovation or Restitution, is made. And as for the Former part, touching Consumption ; This hath many Things common, with Bodies Inanimate, or without Life. For such Things, as the Native Spirit, (which is in all Tangible Bodies, whether living or without Life :) And the Ambient, or Externall, Aire, worketh upon Bodies Inanimate ; The same it attempteth, upon Animate, or Living Bodies ; Although the Vitall Spirit superadded, doth partly breake, and bridle, those Operations : Partly exalt, and advance them wonderfully. For it is most manifest, that Inanimate Bodies, (most of them,) will endure a long time, without any Reparation : But Bodies Animate, without Foode, and Reparation, suddenly fall, and are extinguished ; As the Fire is. So then, our Inquisition shall be double ; First, we will consider the Body of Man, as Inanimate, and not Repaired by Nourishment ; Secondly, as Animate, and Repaired by Nourishment. Thus having prefaced these things, we come now to the Topick Places of Inquisition.

The



THE PARTICULAR Topick Places:

O R,
Articles of Inquisition, Touching
Life and Death.



First inquire, of *Nature Durable*, and *Not Durable*; In Bodies *Inanimate*, or without Life; As also in *Vegetables*: But that, not in a large, or Just Treatise; But, as in a Briefe, or Summary, onely. Also inquire diligently, of *Desiccation*, *Arefaction*, and *Consumption*, of Bodies *Inanimate*; And of *Vegetables*; And of the waies, and Processes, by which they are done: And further of *Inhibiting* and *Delaying*, of *Desiccation*, *Arefaction*, and *Consumption*; And of the *Conservation* of Bodies in their proper State: And againe, of the *Inteneration*, *Emollition*, and *Recovery* of Bodies to their former Freshnesse, after they be once dried, and withered.

Neither neede the Inquisition, Touching these Things, to be full or exact; seeing they pertaine rather, to their proper Title, of *Nature Durable*; seeing also, they are not Principalls, in this Inquisition; But serve onely, to give Light, to the Prolongation, and Instauration of Life, in *Living Creatures*. In which, (as was said before,) the same Things come to passe, but in a Peculiar manner. So from the Inquisition touching Bodies *Inanimate*, and *Vegetables*; Let the Inquisition passe on to other *Living Creatures*, besides Man.

Inquire, touching the Length, and Shortnesse of Life, in *Living Creatures*; with the due Circumstances, which make most, for their long, or Short Lives.

But because the *Duration* of Bodies, is twofold; One in *Identitie*, or the selfe-same substance; The other, by a *Renovation*, or *Reparation*; whereof the former, hath place onely, in Bodies *Inanimate*; The Latter in *Vegetables*, and *Living Creatures*; And is perfected by *Alimentation*, or *Nourishment*; Therefore it will bee fit to inquire of *Alimentation*; And of the waies, and Progresses thereof: yet this, not exactly; (because it pertaines properly to the Titles of *Assimilation* and *Alimentation*;) But as the rest, in progresse onely.

From the Inquisition, touching *Living creatures*, and Bodies repaired by *Nourishment*, passe on to the Inquisition touching Man. And now beeing come to the principall Subject of Inquisition, the Inquisition ought to be, in all points, more precise, and accurate.

Inquire, touching the Length, and Shortnesse of Life, in Men, according to the Ages of the world; The severall Regions, Climates, and Places, of their *Nativity*, & *Habitation*.

Inquire, touching the Length, and Shortnesse of Life, in Men, according to their Races, and Families; As if it were a Thing Hereditary: Also according to their Complexions, Constitutions, and Habits of Body; Their Statures; The Manner, and Time, of their Growth; And the Making, and Composition, of their Members.

Inquire, touching the Length, and Shortnesse, of Life, in Men, according to the Times of their *Nativity*; But so, as you omit, for the present, all *Astrologicall* Observations, and the Figures of Heaven, under which they were born: Onely insist upon the vulgar, and manifest Observations; As whether they were born, in the Seventh, Eighth, Ninth or Tenth Moneth; Also, whether by Night, or by Day; And in what Moneth of the
C
Inquire

8. Inquire touching the *Length*, and *Shortnesse*, of *Life*, in *Men*, according to their *Fare*, *Diet*, *Government* of their *Life*, *Exercises*, and the like. For as for the *Aire*, in which *Men* live, and make their *Abode*, wee account that proper to be inquired of, in the above-said *Article*, touching the *Places* of their *Habitation*.
9. Inquire, touching the *Length*, and *Shortnesse* of *Life*, in *Men*, according to their *Studies*; Their severall *Courses* of *Life*; The *Affections* of the *Minde*; And divers *Accidents* befalling them.
10. Inquire apart, touching those *Medicines*, which are thought to prolong *Life*.
11. Inquire, touching the *Signes*, and *Prognosticks*, of *Long* and *Short Life*; Not those which betoken *Death*, at hand; (for they belong to an *Historie* of *Physicke*;) But those, which are seene, and may be observed, even in *Health*; whether they beee *Physiognomicall* signes, or any other.
- Hitherto have beene propounded *Inquisitions* touching *Length*, and *Shortnesse* of *Life*, besides the *Rules* of *Art*, and in a confused manner; Now wee thinke to adde some, which shall be more *Artlike*, And tending to *Practise*, under the name of *Intentions*. Those *Intentions* are generally, three: As for the particular *Distributions* of them, we will propound them, when wee come to the *Inquisition* it selfe. The three generall *Intentions* are, The *Forbidding* of *Waste* and *Consumption*; The *Perfecting* of *Reparation*; And the *Renewing* of *Oldnesse*.
12. Inquire, touching those things, which *Conserve* and *Exempt* the body of man, from *Arefaction* and *Consumption*; At least, which put off, and protract the inclination thereunto.
13. Inquire, touching those things which pertain to the whole *Processe* of *Alimentation*; (By which the body of man is repaired;) that it may be good, and with the best improvement.
14. Inquire, touching those things which purge out the old *Matter*, and supply with *New*: As also, which doe *Intenerate*, and *Moisten* those parts, which are already dried, and hardned.
- But because it will be hard to know the wayes of *Death*, unless you search out and discover, the *Seat*, or *House*, or rather, *Den* of *Death*; It will be convenient to make *Inquisition* of this *Thing*; yet not of every kinde of *Death*, but of those *Deaths* which are caused, by want, and *Indigence* of *Nourishment*, not by violence: For they are those *Deaths* only, which pertain to a *Decay* of *Nature*, and meere old *Age*.
15. Inquire, touching the point of *Death*; and the porches of *Death* leading thereunto, from all parts: so as that *Death* be caused, by a *Decay* of *Nature*, and not by violence.
- Lastly; Because it is behovefull to know the *Character* and *Form* of *Old Age*; which will then best be done, if you make a *Collection* of all the *Differences*, both in the *State*, and *Functions* of the *Body*, betwixt *Youth* and *Old Age*; That by them you may observe, what it is that produceth such manifold *Effects*; let not this *Inquisition* bee omitted.
16. Inquire diligently, touching the *Differences*, in the *State* of the *Body*, and *Faculties* of the *Minde*, in *Youth* and *Old Age*; And whether there be any that remaine the same without *Alteration*, or *Abatement*, in old *Age*.

Nature Durable, and Not Durable.

The History.

To the first
Article.



- Metals, are of that long lasting, that *Men* cannot trace the *Beginnings* of them. And when they doe decay, they decay through *Rust*, not through *Perspiration* into *Aire*. Yet *Gold* decayes neither way.
2. Quicksilver, though it be an *Humide* and *Fluide* *Body*; And easily made volatile by *Fire*; yet (as far as we have observed) by *Age* alone, without *Fire*, it neither wasteth, nor gathereth *Rust*.
3. Stones, especially the harder sort of them, and many other *Fossiles*, are of long lasting.

ing ; And that, though they be exposed to the open Aire ; Much more, if they be buried in the Earth. Notwithstanding *Stones* gather a kind of *Nitre* ; which is to them, in stead of *Rust*. *Pretious Stones*, and *Crystals*, exceed *Metals* in long Lasting ; But then, they grow dimmer, and lesse Orient, if they be very old.

It is observed, that *Stones*, lying towards the North, doe sooner decay with Age, than those that lie towards the South ; And that appeares manifestly, in *Pyramids*, and *Churches*, and other ancient *Buildings* : Contrariwise, in *Iron*, that exposed to the South, gathers *Rust* sooner ; And that to the North, latter ; As may be seen, in the *Iron Bars* of windowes. And no marvell, seeing in all Putrefaction, (as *Rust* is) Moisture hastens Dissolution ; In all simple Arefaction, Drinesse.

In *Vegetables*, (we speak of such as are feld, not growing,) the stocks or Bodies of harder *Trees*, and the Timber made of them, last divers Ages : But then, there is difference, in the Bodies of *Trees* ; Some *Trees* are, in a manner, Spongie ; as the *Elder* ; In which the pith in the midst is soft, and the outward part harder ; But in timber trees, as the *Oke*, the inner part (which they call, *Heart of Oke*) lasteth longer.

The *Leaves* and *Flowers*, and *stalkes*, of *Plants*, are but of short lasting ; But dissolve into Dust, unlesse they putrifie : the roots are more durable.

The *Bones* of living Creatures last long ; as we may see it of Mens bones, in Charnel Houses. *Hornes* also last very long ; so doe *Teeth* ; as it is seen in *Ivory*, and the *Sea-horse Teeth*.

Hides also, and *Skins*, endure very long ; as is evident in old *Parchment Bookes* : Paper likewise, will last many Ages, though not so long as *Parchment*.

Such *Things* as have passed the *Fire*, last long ; as *Glasse*, and *Bricks*. Likewise, *Flesh*, and *Fruits*, that have passed the fire, last longer than *Raw* : And that not onely, because the baking in the *Fire*, forbids putrefaction ; But also, because the watry Humor being drawne forth, the oyley Humour supports it selfe the longer.

Water, of all *Liquors*, is soonest drunk up by aire ; Contrariwise *Oyle* latest : which we may see, not onely in the *Liquors* themselves ; but in the *Liquors* mixt with other Bodies : For *Paper* wet with water, and so getting some Degree of Transparency, will soon after wax white, and lose the Transparency again, the watry vapour exhaling ; But oyled *Paper* will keep the Transparency long, the *Oyle* not being apt to exhale : And therefore they that counterfeit Mens Hands, will lay the oyled paper upon the writing they mean to counterfeit ; and then assay to draw the lines.

Gummes, all of them, last very long ; The like do wax and Honey.

But the *Equall*, or *Unequall* use of *Things*, conduceth no lesse to long lasting, or short lasting, than the things themselves. For *Timber* and *Stones*, and other *Bodies*, standing continually in the *water*, or continually in the *aire*, last longer than if they were sometimes wet, sometimes dry. And so *Stones* continue longer, if they be layed towards the same coast of Heaven, in the Building, that they lay in the Mine. The same is, of *Plants* removed, if they be coasted just as they were before.

Observations.

Let this be laid for a Foundation, which is most sure ; That there is, in every *Tangible body*, a Spirit, or body Pneumaticall, enclosed and covered with the *Tangible parts* ; And that from this Spirit, is the beginning of all Dissolution and Consumption : so as the Antidote against them, is the Detaining of this Spirit.

This Spirit is detained two wayes ; Either by a straight Inclosure, as it were in a Prison ; Or by a kind of Free and Voluntary Detention. Again, this voluntary stay is perswaded two wayes : Either if the Spirit it selfe be not too Moveable, or Eager to depart ; Or if the externall Aire importune it not too much to come forth. So then, two sorts of substances are Durable ; Hard Substance, and Oyle : Hard Substance binds in the Spirit close ; Oyle, partly enticeb the Spirit to stay ; partly, is of that nature, that it is not importuned by Aire : For Aire is Consubstantiall to Water, and Flame to Oyle. And touching Nature Durable, and Not Durable, in Bodies inanimate, thus much.

The History.

Herbs, of the Colder sort, dye yearly, both in Root and Stalk ; As *Lettice*, *Purslane* ; Also wheat, and all kinde of *Corn*. Yet there are some cold Herbs, which will last three

- three or foure yeares, As the *Violet*, *Strawbery*, *Burnet*, *Prime-rose*, and *Sorrell*. But *Borage* and *Buglosse*, which seem so alike, when they are alive, differ in their Deaths; for *Borage* will last but one yeare, *Buglosse* will last more.
14. But many *hot Herbs*, beare their age and yeares better; *Hysope*, *Thyme*, *Savourie*, *Pot-Marjoram*, *Balme*, *woormwood*, *Germander*, *Sage*, and the like. *Fennell* dies yearly in the stalk, buds again from the root. But *Pulse* & *sweet Marjoram*, can better endure age than Winter; For being set in a very warm place, and well fenced, they will live more than one yeare. It is knowne, that a knot of *Hysope* twice a yeare shorne, hath continued forty yeares.
15. *Bushes* and *Shrubs*, live threescore yeares, and some double as much. A *Vine* may attain to threescore yeares, and continue fruitfull in the old age. *Rose-mary* well placed, wil come also to threescore yeares. But *white Thorn*, and *Ivie*, endure above an hundred yeares. As for the *Bramble*, the age thereof is not certainly known; because bowing the head to the ground, it gets new roots; so as you cannot distinguish the Old, from the New.
16. Amongst great *Trees*, the longest livers are; The *Oke*, the *Holme*, the *wild-Ash*, the *Elme*, the *Beech-tree*, the *Chestnut*, the *Plain-tree*, *Ficus Ruminalis*, the *Lote-tree*, the *wilde-Olive*, the *Palm-tree*, and the *Mulberry-tree*: Of these some have come to the Age of eight hundred yeares; but the least livers of them do attain to two hundred.
17. But *Trees* *Odorate*, or that have sweet woods; and *Trees* *Rozennie*, last longer in their Woods, or Timber, than those abovesaid, but they are not so long liv'd; as the *Cypress-tree*, *Maple*, *Pine*, *Box*, *Iuniper*. The *Cedar* being born out by the vastnesse of his body, lives well-neare as long as the former.
18. The *Ash*, fertile, and forward in bearing, reacheth to an hundred yeares, and somewhat better; which also the *Birch*, *Maple*, and *Service-tree* sometimes doe: but the *Poplar*, *Lime-tree*, *Willow*, and that which they call the *Cycomore*, and *walnut-tree*, live not so long.
19. The *Apple-tree*, *Pear-tree*, *Plum-tree*, *Pomegranate-tree*, *Citron-tree*, *Medlar-tree*, *Black-cherry-tree*, *Cherry-tree*, may attain to fifty or fixty yeares; especially if they be cleansed from the mosse wherewith some of them are cloathed.
20. Generally, greatnesse of bodie in trees, if other things be equal, hath some congruity with length of life: So hath bardnesse of substance: And trees bearing *Mast*, or *Nuts*, are commonly longer livers than trees bearing fruit or berries: Likewise, trees putting forth their leaves late, and shedding them late again, live longer than those that are early, either in leaves or fruit. The like is of *wild-trees*, in comparison of *Orchard-trees*: And lastly, in the same kinde, trees that beare a *sowre fruit*, out-live those that beare a *sweet fruit*.

An Observation.

- I Aristotle noted well the difference between Plants and living Creatures, in respect of their Nourishment and Reparation; Namely, that the Bodies of living Creatures, are confined within certaine Bounds, and that after they be come to their full Growth, they are continued and preserved by Nourishment, but they put forth nothing New, except Haire and Nailes; which are counted for no better than Excrements; so as the juyce of living Creatures, must, of necessity, sooner wax old: but in trees, which put forth yearly new Boughes, new Shoots, new Leaves, and new Fruits; It comes to passe, that all these parts in Trees, are once a yeare young and renewed. Now, it being so, that whatsoever is fresh and young, drawes the Nourishment more lively and cheerfully to it, than that which is decayed and old; It happens withall, that the Stock and Body of the Tree, through which the Sap passeth to the Branches, is refreshed and cheered, with a more bountifull and vigorous Nourishment in the passage, than otherwise it would have been. And this appeares manifestly (though Aristotle noted it not; Neither hath he expressed these things so clearly and perspicuously.) In Hedges, Copses, and Pollards, when the plashing, shedding, or lopping, comforteth the old Stemme, or Stock, and maketh it more flourishing, and longer liv'd.

Desiccation; prohibiting of Desiccation; and Inteneration of that which is desiccated and dried.

The Historie.



re and strong Heates dry somethings, and melt others.

Limus ut hic durescit, & hac ut Cera liquefit, Vno eodemque Igne.

How this Clay is hardned, and how this wax is melted, with one and the same thing, Fire; It dryeth Earth, Stones, Wood, Cloth, and Skins, and whatsoever is not liquefiable; and it melteth Metalls, VVax, Gums, Butter, Tallow, and the like.

Notwithstanding, even in those things, which the Fire melteth, if it be very vehement & continueth, it doth at last dry them. For Metall in a strong Fire (Gold only excepted) the volatile part being gone forth, will become lesse ponderous, and more brittle: and those Oily, and fat Substances, in the like Fire, will burne up, and be dried, and parched.

Aire, especially open Aire, doth manifestly dry but not melt: as High wayes, and the upper part of the Earth, moistned with showers, are dried; linnen Clothes, washed, if they be hanged out in the Aire, are likewise dried; Herbs, and Leaves, and Flowers, laid forth in the shade, are dried. But much more suddenly doth the Aire this; If it bee either inlightned with the Sun-beames (so that they cause not putrefaction) Or if the Aire bee stirred; as when the Winde bloweth; Or in Roomes open, on all sides.

Age most of all, but yet slowest of all, dryeth; as in all bodies, which (if they be not prevented by putrefaction) are drye with Age. But Age is nothing of it selfe; being onely the measure of time: That which causeth the Effect, is the native Spirit of bodies, which sucketh up the moisture of the body, and then, together with it, flyeth forth; and the Aire ambient, which multiplieth it selfe, upon the native spirits, and juyces of the body, and preyeth upon them.

Cold, of all things, most properly, dryeth; for Drying is not caused, but by Contraction; Now Contraction is the proper worke of Cold. But because we Men have Heat in a high Degree, namely that of Fire; but Cold in a very low degree, none other than that of VVinter; Or perhaps of Ice, or of Snow, or of Nitre: therefore the Drying caused by Cold, is but weak, and easily resolved. Notwithstanding wee see the Surface of the Earth, to bee more dried by Frost, or by March windes, than by the sunne; seeing the same winde, both licketh up the moisture, and affecteth with Coldnesse.

Smoke is a Dryer; as in Bacon, and Neates tongues which are hanged up in chimneys: and perfumes of Olibanum, or Lignum Aloes, and the like, dry the Braine & cure Catarrhs.

Salt, after some reasonable continuance, dryeth; not only on the outside, but in the inside also; as in Flesh and Fish salted, which if they have continued any long time, have a manifest hardnesse within.

Hot Gummes, applied to the skin, dry, and wrinkle it; and some Astringent waters, also doe the same.

Spirit of strong wines, imitateth the Fire in Drying: For it will both potch an Egge, put into it; and toast Bread.

Powders dry like sponges, by Drinking up the Moisture, as it is in Sand, throwne upon Lines, new written. Also Smoothnesse, and Politenesse, of Bodies (which suffer not the Vapour of Moisture, to goe in by the Pores,) Drie by accident, because it exposeth it to the Aire; As it is seene in Precious stones, Looking-Glasses, and Blades of Swords; Upon which if you breath, you shall see at first a little Mist; But soone after it vanisheth, like a Cloud. And thus much for Desiccation, or Drying.

They use at this day, in the East parts of Germany, Garners, in Vauls under Ground; wherein they keep Wheat & other Grains; Laying a good quantity of Straw, both under the Grains, & about them, to save them from the Danknes of the Vault: By which device they keep their Grains 20 or 30 years. And this doth not only preservethem from Fustinesse, but (that which pertaines more to the present Inquisition) preserves them also in that Greennesse, that they are fit, and serviceable to make Bread. The same is reported, to have bene in use, in Cappadocia, and Thracia, and some parts of Spaine.

The placing of Garners, on the Tops of Houses, with Windowes towards the East, and North, is very commodious. Some also make two Sollars; An Upper, and a Lower And the upper Sollar hath an hole in it; thorow which the Graine continually descendeth, like Sand in an Houre-glasse; And after a few dayes, they throw it up againe with Shovels; That so it maybe in continuall Motion. Now it is to be noted,

To the 2
Artic.

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12.

that this doth not only prevent the Fustineis, but conserveth the greenness, and slacketh the Deficcation of it: The cause is that which we noted before; That the Discharging of the watry humor, which is quickned by the Motion, and the winds, preserves the Oily Humour in his Being; Which otherwise would fly out, together with the Watry Humor. Also in some Mountaines, where the Aire is very pure, Dead Carcases may be kept for a good while, with out any great Decay.

13. Fruits As Pomegranates, Cytrons, Apples, Peares, and the like. Also Flowers; As Roses and Lilies; may be kept, a long time, in Earthen Vessels, close stopped. Howsoever they are not free from the Injuries of the outward Aire, which will affect them, with his unequal Temper, thorow the sides of the vessell; As it is manifest, in Heat and cold. Therefore it will be good to stop the Mouths of the vessels carefully, and to bury them within the Earth, And it will be as good; Not to bury them in the Earth, but to sink them in the Water, so as the place be shady; As in Wells; Or Cisternes placed within Dores: But those that be sunk in Water, wil do better in Glas vessels, than in Earthen.
14. Generally, those Things Which are kept in the Earth, or in Vaults under Ground, or in the Bottome of a Well, will preserve their Freshnesse longer, than those Things that are kept above Ground.
15. They say, it have been observed; That in Conservatories of Snow, (whether they were in Mountaines, in Naturall Pits, or in Wells made by Art, for that purpose) an Apple, or Chest-nut, or Nut, by chance falling in, after many Moneths, when the Snow hath melted, have beene found in the Snow, as fresh and faire, as if they had been gathered the day before.
16. Country people keep Clusters of Grapes in Meale, which though it makes them lesse pleasant to the tast, yet it preserves their Moisture, and Freshnesse. Also the Harder sort of Fruits may be kept long, not only in Meale, but also in Saw-dust, & in Heaps of Corn.
17. There is an opinion held; That Bodies may be preserved Fresh in Liquors of their own kind; As in their proper Menstrua; As to keep Grapes in wine, Olives in Oyle.
18. Pomegranates, and Quinces, are kept long, being lightly dipped in Sea water, or Salt water; And soone after taken out againe; and then dryed in the open Aire, so it bee in the Shade.
19. Bodies put in Wine, Oyle, or the Lees of Oyle, keepe long; Much more in Honey, or Spirit of Wine; But most of all, as some say, in Quick-silver.
20. Fruits enclosed in Waxe, Pitch, Plaister, Paste, or any the like Case, or Covering, keep green very long.
21. It is manifest, that Flies, Spiders, Ants, or the like small Creatures, falling by chance into Amber, or the Gums of Trees, and so finding a Buriall in them, doe never after corrupt, or rot, although they be soft and tender Bodies.
22. Grapes are kept long by being hanged up in Bunches; The same is of other Fruits. For there is a twofold commodity of this Thing; The one, that they are kept without Pressing, or Bruising; which they must needs suffer, if they were laid upon any hard substance; The other, that the Aire doth encompasse them, on every side alike.
23. It is observed, that Putrefaction, no lesse than Deficcation, in Vegetables, doth not begin in every part alike, But chiefly in that part, where, being alive, it did attract Nourishment. Therefore some advise, to cover the Stalkes of Apples, or other Fruits, with VVax, or Pitch.
24. Great Wiekes of Candles, or Lamps, doe sooner consume the Tallow, or Oyle, than lesser Wiekes: Also Wiekes of Cotten, sooner than those of Rush, or Straw, or small Twigs: And in Staves of Torches, those of Juniper, or Firre, sooner than those of Ash: Likewise, Flame Moved, and Fanned with the Wind, sooner than that which is still; And therefore Candles, set in a Lanthorne, will last longer, than in the Open Aire. There is a Tradition, that Lamps set in Sepulchers, will last an incredible time.
25. The Nature also, and Preparation of the Nourishment conduceeth no lesse, to the Lasting of Lamps, and Candles, than the Nature of the Flame: For Wax will last longer than Tallow; And Tallow a little wet, longer than Tallow dry; And Wax Candles old made, longer than Wax Candles new made.
26. Trees, if you stir the Earth about their Roots every yeare, will continue lesse time; If once in foure, or perhaps in ten yeares, much longer: Also Cutting off the Suckers, and Young shoots, will make them live the longer: But Dugging them, or laying of Marle about their Rootes, or much VVatring them, addes to their fertility, but cuts off from their long Lasting. And thus much touching the Prohibiting of Deficcation, or Consumption.

The *Inteneration*, or making Tender, of that which is *Dryed* (which is the chiefe Matter) affords but a small Number of *Experiments*. And therefore some few *Experiments*, which are found in *Living Creatures*, and also in *Man*, shall bee joyned together.

Bands of Willow, wherewith they use to bind Trees, laid in water, grow more flexible: Likewise, they put *Boughes of Birch*, (the ends of them) in earthen pots filled with water, to keep them from *withering*; And *Bowles* cleft with *Drineste*, steeped in water, close again.

Boots, growne hard and obstinate with age, by greasing them before the fire with *Tallow*, wax soft; or being only held before the Fire, get some softnesse: *Bladders* and *Parchments* hardned also, become tender, with warm water, mixed with *Tallow*, or any *Fat Thing*; but much the better, if they be a little *Coased*.

Trees growne very old, that have stood long without any Culture, by *Digging*, and *Opening* the Earth, about the Roots of them, seem to grow young again, and put forth young Branches.

Old *Draught Oxen*, worn out with labour, being taken from the yoke, and put into fresh pasture, will get young and tender flesh againe; insomuch, that they will eat as fresh and tender, as a *Steere*.

A strict *Emaciating Dyet*, of *Guaiacum*, *Bisket*, and the like; (wherewith they use to cure the *French Pox*, old *Catarrhs*, and some kind of *Dropsies*,) doth first bring men to great Poverty and Leanness, by wasting the Juices and Humours of the Body; which after they begin to be repaired again, seem manifestly more vigorous and young: Nay, and we are of opinion, that *Emaciating Diseases*, afterwards well cured, have advanced many in the way of *Long Life*.

Observations.

MEN see clearly, like Owles in the Night, of their own Notions; But in Experience, as in the Day-light, they winke, and are but halfe-sighted. They speak much of the *Elementary Quality* of Siccity, or *Drineste*; and of things *Desiccating*; and of the *Naturall Periods* of Bodies, in which they are corrupted, and consumed: But mean while, either in the *Beginnings*, or *Middle Passages*, or *Last Acts* of *Desiccation*, and *Consumption*, they observe nothing that is of Moment.

Desiccation, or *Consumption*, in the *Processe* thereof, is finished by three Actions; and all these (as was said before) have their originall from the Native Spirit of bodies.

The first Action is, the Attenuation of the Moisture into Spirit: The second is, the Issuing forth, or Flight of the Spirit; The third is, the Contraction, of the Groffer parts of the body, immediatly after the Spirit issued forth: And this last, is that *Desiccation*, and *Induration*, which we chiefly handle; The former two consume onely.

Touching Attenuation, the matter is manifest. For the Spirit, which is inclosed in every *Tangible Body*, forgets not his Nature; but whatsoever it meets withall in the body (in which it is inclosed) that it can digest, and master, and turn into it self; That it plainly alters and subdues, and multiplies it self upon it, and begets new Spirit. And this is evicted by one proof in stead of many; For that those things, which are thorowly *Dried*, are Lessened in their Weight, & become hollow, porous, and resounding from within. Now it is most certain, that the inward Spirit of any thing, confers nothing to the weight; but rather lightens it; And therefore it must needs be, that the same Spirit hath turned into it, the Moisture and Juice of the Body, which weighed before; By which means the weight is lessened. And this is the first Action; the Attenuation of the Moisture, and converting it into Spirit.

The second Action, which is the issuing forth, or Flight of the Spirit, is as manifest also. For that Issuing forth, when it is in throngs, is apparent even to the sense; In Vapours, to the sight; in Odours, to the smelling: But if it issueth forth slowly (as when a thing is decayed by Age,) then it is not apparent to the sense; but the matter is the same. Again, where the composition of the body, is either so strait, or so tenacious; that the Spirit can find no pores, or passages, by which to depart; Then, in the striving to get out, it drives before it the groffer parts of the body; and protrudes them beyond the superficies or surface of the body; as it is in the rust of Metals; and Mould of all Fat things. And this is the second Action, the Issuing forth, or Flight of the Spirit.

The third Action is somewhat more obscure, but full as certain: That is, The Contraction of the Groffer parts, after the Spirit issued forth. And this appears first, in that bodies after the Spirit issued forth, do manifestly shrink, and fill a lesse room; as it is in the Kernels of Nuts, which after they are dried, are too little for the Shells; And in Beames and Planchers of

of Houses, which at first lay close together, but after they are dried, gape; And likewise in Bowels which through Drought, grow full of Crannies, The parts of the Bowle contracting themselves together, and after Contraction must needs bee emptie Spaces. Secondly, it appears by the Wrinkles of Bodies Dried, For the Endeavour of Contracting it selfe is such; That by the Contraction, it brings the Parts nearer together, and so lifts them up; For whatsoever is Contracted on the sides, is lifted up in the Midst; And this is to be seene, in Papers, and old Parchments; And in the Skins of Living Creatures; And in the Coats of Soft Cheeses; All which, with Age, gather wrinkles. Thirdly, this Contraction shewes it selfe Most, in those things, which by Heat, are not only wrinkled, but ruffled, and plighted, and, as it were, rowled together; As it is in Paper s, and Parchments, and Leaves, brought neare the Fire. For Contraction, by Age, which is more Slow, commonly causeth wrinkles; But Contraction, by the Fire, which is more speedie, causeth Plighting. Now in most Things, where it comes not to Wrinkling, or Plighting; there is simple Contraction, and Angultiation, or Straitning, and Induration or Hardning, and Desiccation; As was shewed in the first Place: But if the Issuing forth of the Spirit; and Absumption, or wast of the Moisture, bee so great; That there is not left Bodie sufficient to unite and contract it selfe; Then, of Necessitie, Contraction must cease; And the bodie become putride And nothing else, but a little Dust, cleaving together which with a light touch, is dispersed, & falleth asunder; As it is in Bodies that are Rotten, & in Paper burnt; And Linnen made into Tinder; And Carcases Embalmed, after many Ages. And this is the Third Action; The Contraction of the Grosser Parts after the Spirit issued forth.

7

It is to be noted, That Fire, and Heat, dry only by Accident. For their proper Worke is, to attenuate, and dilate the Spirit, and Moisture; And then it followes by Accident, that the other Parts should contract themselves; Either for the Flying of Vacuum alone; Or for some other Motion withall; Whereof wee now speake not.

8

It is certaine that Putrefaction, takes his Originall, from the Native Spirit, no lesse than A refaction; But it goeth on a far different way; For in Putrefaction, the Spirit, is not simply vapoured forth; But being detained in Part, workes strange Garboises; And the Grosser Parts, are not so much locally contracted, as they congregate themselves to Parts of the same Nature.



Length, and Shortnesse of Life in living Creatures.

The Historie.

To the first
Article.

Touching the Length, and Shortnes of Life in Living Creatures, the information, which may be had, is but Slender; Observation is Negligent; And Tradition Fabulous. In Tame Creatures, their Degenerate Life, corrupteth them; In wild Creatures, their Exposing to all weathers, often intercepteth them. Neither doe those Things, which may seeme Concomitants, giue any Furtherance, to this Information, (The Greatnesse of their Bodies; Their Time of Bearing in the Womb; The Number of their Young ones; The Time of their Growth; And the Rest;) In Regard that these Things are Intermixed, and sometimes they concur, sometime s they sever:

1

Mans Age (as farre as can be gathered by any certaine Narration,) doth exceed the Age, of all other Living Creatures; Except it be, of a very few onely. And the Concomitants in him, are very equally disposed; His Stature, and Proportion, large; His Bearing in the Wombe, nine Moneths; His Fruit, commonly, one, at a Birth; His Pubertie at the Age of Fourteen yeares; His Time of Growing, till Twenty.

The Elephant, by undoubted Relation, exceeds the Ordinary Race of Mans life: But his Bearing in the Wombe, the space often yeares, is fabulous; Of two yeares, or at least, above one, is certaine: Now his Bulke is great; His Time of Growth, untill the thirtieth yeare; His Teeth exceeding hard: Neither hath it beene unobserved; That his Blood is the coldest of all Creatures: His Age, hath sometimes reached to two hundred yeares.

2

Lions are accounted long Livers, because many of them, have beene found Toothlesse; A signe not so certaine; For that may be caused by their strong Breath.

The Bear is a great Sleeper; A Dull Beast, and given to ease; And yet not noted for

for long Life: Nay hee hath this signe of short Life; That his *Bearing* in the *Wombe* is but short; scarce full forty dayes.

The *Fox* seemes to bee well disposed, in many things, for long life; He is well skinned, feeds on *Flesh*, lives in *Dens*; And yet hee is noted not to have that propertie. Certainly, hee is a kinde of *Dog*; And that kinde is but short liv'd.

The *Camel* is a long Liver: A lean Creature, and Sinewy: So that he doth ordinarily attaine to Fifty; And sometimes to an hundred yeares.

The *Horse* lives but to a moderate Age; scarce to fortie yeares; His Ordinarie Period is Twentie yeares. But perhaps, he is beholding, for this shortnesse of Life, to *Man*: For we have now no *Horses* of the *Sunne*; That live freely, and at pleasure, in good pastures. Notwithstanding the *Horse* growes, till hee bee six yeares old; And is able for Generation, in his old age. Besides, the *Mare* goeth longer with her young one, than a *Woman*; And brings forth two at a Burthen more rarely. The *Ass* lives commonly to the *Horses* Age; But the *Mule* out-lives them both

The *Hart* is famous amongst Men, for long Life; yet not upon any Relation, that is undoubted. They tell of a certain *Hart*, that was found with a Collar about his Neck, and that Collar hidden with Fat. The long Life of the *Hart*, is the lesse credible, because hee comes to his perfection at the Fifth yeare; And not long after, his *Hornes*, (which hee sheds, and renews yearly) grow more Narrow at the Root, and lesse Branched.

The *Dog* is but a short Liver: He exceeds not the Age of Twentie yeares; And for the most part lives not to fourteen yeares. A Creature of the hottest Temper, and living in extremes; for he is commonly, either in vehement Motion, or Sleeping; besides, the *Bitch*, bringeth forth many at a burthen, and goeth nine weekes.

The *Oxe* likewise, for the Greatnesse of his body, and strength, is but a short Liver; About some sixteen yeares: and the *Males* live longer than the *Females*: Notwithstanding, they beare, usually, but one at a Burthen, and goe nine Moneths. a Creature dull & fleshy, and soon fatted, and living onely upon Herby substances without Graine.

The *Sheep* seldome lives to ten yeares; Though hee bee a Creature, of a moderate size, and excellently clad: And, that which may seeme a wonder, being a Creature with so little a Gall, yet he hath the most curled coat, of any other; for the *Haire* of no Creature, is so much curled as *Wool* is. The *Rams* generate not before the third yeare, And continue able for Generation, untill the eighth: The *Ewes* beare young, as long as they live. The *Sheep* is a diseased Creature; And rarely lives to his full Age.

The *Goat* lives to the same Age, with the *Sheepe*; and is not much unlike in other things; Though hee bee a Creature more Nimble, and of somewhat a firmer *Flesh*; and so should be longer liv'd: but then he is much more lascivious; and that shortens his Life.

The *Sow* lives to fifteen yeares, sometimes to twentie: and though it be a Creature of the Moistest *Flesh*; yet that seemes to make nothing to Length of Life. Of the *Wilde Boare*, or *Sow*, we have nothing certaine.

The *Cats* Age, is betwixt six, and ten yeares. A Creature nimble, and full of spirit, whose seed, (As *Aelian* reporteth) burneth the Female. Whereupon it is said, That the *Cat* conceives with paine, & brings forth with ease. A creature ravenous in eating, Rather swallowing downe his Meat whole, than Feeding.

Hares and *Conies* attaine scarce to seven yeares: Being both Creatures Generative, and with young ones, of severall conceptions, in their bellies: In this they are unlike, that the *Coney* lives under Ground, and the *Hare* above Ground; And againe, that the *Hare* is of a more dusky *Flesh*.

Birds, for the size of their Bodies, are much lesse than *Beasts*: for an *Eagle*, or *Swan*, is but a small thing in comparison of an *Oxe*, or *Horse*; And so is an *Estrich* to an *Elephant*.

Birds are excellently well clad; For *Feathers*, for warmth, and close fitting, to the Body, exceed *Wool*, and *Haires*.

Birds, though they hatch many young ones together, yet they beare them not all in their Bodies at once; But lay their Egges by turnes; whereby, their Fruit hath the more plentifull nourishment, whilst it is in their bodies.

Birds chew, little or nothing; but their meat is found whole in their crops; notwithstanding they will breake the shells of Fruits, and pick out the *Kernels*: they are thought to be, of a very hot and strong concoction.

20. The Motion of *Birds*, in their Flying, is a mixt Motion; Consisting, of a moving of the Lims, and of a kinde of Carriage; which is, a most wholesome kinde of Exercise.
21. *Aristotle* noted well, touching the Generation of *Birds*; (But he transferred it ill to other *living Creatures*;) That the seed of the Male, confers lesse to Generation, than the Female; But that it rather affords Activity, than Matter: so that Fruitfull Egges, and unfruitfull Egges, are hardly distinguished.
22. *Birds*, (almost all of them,) come to their full Growth, the first yeare, or a little after: It is true, that their Feathers, in some kindes, and their bills, in others, shew their yeares; but for their Growth of their bodies, it is not so.
23. The *Eagle* is accounted a long Liver; yet his yeares are not set downe. And it is alledged, as a signe of his long life; That he casts his bill; whereby he growes young againe. From whence comes that Proverb; *The Old Age of an Eagle*. Notwithstanding, perchance, the matter may be thus; That the renewing of the *Eagle* doth not cast his bill; but the casting of his bill, is the renewing of the *Eagle*: For after that his bill is grown, to a great crookednesse, the *Eagle* feeds, with much difficultie.
24. *Vultures* also are affirmed to be long Livers; Insomuch that they extend their Life, well-neare to an hundred yeares: *Kites* likewise, and so all *Birds* that feed upon Flesh, and *Birds* of prey live long. As for *Hawkes*, because they lead a degenerate, and servile life, for the Delight of Men; The Terme of their Naturall Life is not certainly knowne: Notwithstanding, amongst *Mewed Hawkes*, some have beene found, to have lived thirtie yeares. And amongst *wilde Hawkes*, fortie yeares.
25. The *Raven* likewise, is reported to live long; Sometimes, to an hundred yeares. Hee feeds on Carrion; And flies not often, but rather is a sedentarie, and Melancholy bird; and hath very black flesh. But the *Crow* like unto him in most things; (Except in Greatnesse, and voice;) lives not altogether so long; And yet is reckoned amongst the long Livers.
26. The *Swan*, is certainly found, to bee a long Liver; and exceeds, not unfrequently, an hundred yeares. He is a *Bird* excellently plumed; A Feeder upon Fish; and is alwayes carried, And that in Running Waters.
27. The *Goose* also may passe amongst the Long-livers; Though his food bee commonly Grasse, and such kinde of Nourishment; Especially, the *Wilde-Goose*; whereupon, this Proverb grew amongst the *Germans*; *Magis senex quam Anser Nivalis*; Older than a *Wilde-Goose*.
28. *Storkes* must needs bee Long-livers; If that be true, which was anciently observed of them; That they never came to *Thebes*, because that Citie was often sacked. This if it were so; Then either, they must have the knowledge of more Ages than one; Or else the old Ones, must tell their young, the History. But there is Nothing more frequent than *Fables*.
29. For *Fables* doe soe abound, touching the *Phoenix*; That the truth is utterly lost, if any such *Bird* there be. As for that, which was so much admired; That she was ever seen abroad, with a great Troope of *Birds* about her, it is no such wonder: For the same is usually seene, about an *Owle* flying in the Day time, or a *Parret* let out of a Cage.
30. The *Parret*, hath been certainly known, to have lived threescore yeares in *England*; How old soever hee was, before he was brought over. A *Bird*, eating almost all kinde of Meats, chewing his Meat, and renewing his Bill; Likewise, curst, and mischievous, and of a blacke Flesh.
31. The *Peacock* lives Twentie yeares; But hee comes not forth with his *Argus Eyes*, before he be three yeares old: A *Bird* slow of pace, having whitish Flesh.
32. The *Dunghill Cock*, is venereous, Martiall, and but of a short life; A cranke *Bird*; having also white flesh.
33. The *Indian Cock*, commonly called, The *Turkey-Cock*, lives not much longer, than the *Dunghill-Cock*: An Angry *Bird*; And hath exceeding white flesh.
34. The *Ring-Doves*, are of the longest sort of Livers; Insomuch, that they attaine, sometimes, to fifty yeares of Age: An Aery *Bird*; And both builds, and Sits, on high: But *Doves*, and *Turtles*, are but short liv'd, not exceeding eight yeares.
35. But *Pheasants*, and *Partridges*, may live to fixteene yeares: They are great breeders; but not so white of Flesh, as the ordinarie Pullen.

The *Black-bird* is reported to be, amongst the lesser birds, one of the longest livers :
An unhappy bird, and a good finger.

The *Sparrow* is noted to be of a very short life ; and it is imputed in the Males, to their lasciviousness. But the *Linnet*, no bigger in body, than the *Sparrow*, hath been observed to have lived twenty yeares.

Of the *Estrich* we have nothing certain : Those that were kept here, have been so unfortunate, that no long life appeared by them. Of the bird *Ibis*, we finde onely, that he liveth long ; but his yeares are not recorded.

The age of *Fishes* is more uncertain than that of terrestrial Creatures ; because living under the water, they are the lesse observed. Many of them breath not ; by which means their vitall Spirit is more closed in : And therefore, though they receive some refrigeration by their Gills, yet that refrigeration is not so continuall, as when it is by breathing.

They are free from the *Desiccation*, and *Depredation* of the *Aire Ambient*, because they live in the water : yet there is no doubt, but the *water ambient*, and piercing, and received into the pores of their Body, doth more hurt to long life, than the *Aire* doth.

It is affirmed too, that their blood is not warm : Some of them are great devourers, even of their own kinde. Their flesh is softer, and more tender, than that of terrestriall Creatures. They grow exceedingly fat ; infomuch that an incredible quantity of oyle will be extracted out of one Whale.

Dolphins are reported to live about 30 yeares : of which thing a triall was taken in some of them, by cutting off their tails : They grow untill ten yeares of age.

That which they report of some *Fishes*, is strange, that after a certain age, their bodies will waste, and grow very slender ; onely their head and taile retaining their former greatness.

There were found in *Cæsars* Fish-ponds, *Lampreyes* to have lived threescore yeares : They were grown so familiar with long use, that *Crassus* the Orator solemnly lamented one of them.

The *Pike*, amongst *Fishes*, living in fresh water, is found to last longest ; sometimes to forty yeares : He is a Ravener, of a flesh somewhat dry and firm.

But the *Carp*, *Bream*, *Tench*, *Eele*, and the like, are not held to live above ten yeares.

Salmons are quick of growth, short of life : so are *Trouts* : but the *Perch* is slow of growth, long of life.

Touching that monstrous bulk of the *Whale*, or *Orke*, how long it is weilded by vitall spirit, we have received nothing certain : neither yet touching the *Sea-calse*, and *Sea-bog*, and other innumerable *Fishes*.

Crocodiles are reported to be exceeding long liv'd, and are famous for the time of their growth, for that they, amongst all other creatures, are thought to grow during their whole life. They are of those Creatures that lay Egges, ravenous, cruell, and well-fenced against the waters. Touching the other kindes of *Shel-fish*, we finde nothing certain, how long they live.

Observations.

TO finde out a Rule touching Length and Shortness of Life, in Living Creatures, is very difficult, by reason of the negligence of observations, and the intermixing of Causes : A few things we will set down.

There are more kindes of Birds found to be long liv'd, than of Beasts ; (as the Eagle, the Vulture, the Kite, the Pelican, the Raven, the Crow, the Swan, the Goose, the Storke, the Crane, the bird called the *Ibis*, the Parret, the Ring-dove, with the rest ; though they come to their full growth within a yeare, and are lesse of bodies ; surely their cloathing is excellent good against the distemperatures of the weather. And besides, living for the most part, in the open aire, they are like the inhabitants of pure *Mountaines*, which are long liv'd. Againe, their Motion, which (as we elsewhere said) is a mixt Motion, compounded of a moving of their Limbs, and of a carriage in the aire, doth lesse wearie and weare them, and is more wholesome. Neither doe they suffer any compression, or want of nourishment in their mothers bellies ; because the Egges are laid by turnes ; But the chiefeft cause of all I take to be this, that Birds are made more of the substance of the Mother, than of the Father, whereby their Spirit is not so eager and hot.

2 It may be a position; that Creatures, which partake more of the substance of their Mother, than of their Father, are longer liv'd; As Birds are; which was said before. Also that those which have a longer time of Bearing in the wombe, doe partake more of the substance of the Mother, lesse of the Father; And so are longer liv'd: Insomuch that we are of opinion, that even amongst Men, (which we have noted in some,) those that resemble their Mothers most, are longest liv'd: And so are the children of old Men, begotten upon young wives; If the Fathers be sound, not Diseased.

3 The First Breeding of Creatures, is ever most Materiall, either to their Hurt, or Benefit. And therefore it stands with Reason; That the lesser Compression, and the more liberall Alimentation of the young one, in the wombe, should conferre much to Long Life; Now this happens, when either the young ones are brought forth successively, as in Birds; Or when they are single Births; As in Creatures bearing but one at a Burthen.

4 But Long Bearing, in the wombe, makes for Length of Life three waies. First, for that the young one partakes more of the substance of the Mother; As hath been said. Secondly, that it comes forth more strong, and able. Thirdly, that it undergoes the predatorie Force of the Aire, latter. Besides it shewes, that Nature intendeth to finish her periods, by larger Circles. Now though Oxen and Sheepe, which are borne in the wombe, about six Moneths, are but short liv'd: That happens for other Causes.

5 Feeders upon Grasse, and meer Herbs, are but short Livers: And Creatures feeding upon Flesh, or Seeds, or Fruits, long Livers; As some Birds are. As for Harts, which are long liv'd, They take the one halfe of their Meat, (As men use to say) from above their Heads. And the Goose, besides Grasse, findeth something in the water, and stubble to feed upon.

6 Wee suppose that a good Clothing of the Body, maketh much to long Life: For it Fenceth, and Armeth, against the Intemperances of the Aire, which doe wonderfully Assaile, and Decay the Body: which Benefit Birds especially have. Now that Sheepe, which have so good Fleeces, should be so short liv'd; That is to be imputed to Diseases, whereof that Creature is full; and to the bare eating of Grasse.

7 The seat of the Spirits, without doubt, is principally the Head: Which though it be usually understood, of the Animall Spirits onely, yet this is all in all. Againe, it is not to be doubted, but the Spirits doe, most of all, waste, and prey upon the Body; so that when they are either in greater plenty; Or in greater Inflammation, and Acrimonie; There the life is much shortned. And therefore we conceive, a great Cause of long life, in Birds, to be; The Smalnesse of their Heads, in comparison of their Bodies: For even Men, which have very great Heads, we suppose to be the shorter Livers.

8 We are of opinion; That Carriage, is of all other Motions, the most helpfull to long life; which we also noted before. Now there are carried; Water-fowles, upon the water; As Swans: All Birds in their flying, but with a strong Endeavour of their Lims; And Fishes, of the length of whose life we have no certaintie.

9 Those Creatures which are long, before they come to their perfection; (Not speaking of Growth in stature onely, but of other steps to Maturitie; As Man puts forth, First his Teeth; Next the Signes of Pubertie; Then his Beard; And so forward;) are Long-liv'd. For it shews, that Nature finisheth her Periods, by larger Circles.

10 Milder Creatures, are not long-liv'd; As the Sheepe, and Dove: For Choler is as the Whetstone and Spur, to many Functions in the Body.

11 Creatures, whose Flesh is more Dusky, are longer liv'd than those that have white Flesh: For it sheweth that the Juice of the Body is more firme, and lesse apt to dissipate.

12 In every corruptible Body, Quantitie maketh much, to the Conservation of the whole: For a great fire is longer in quenching; A small portion of water is sooner evaporated; The Body of a Tree withereth not so fast as a Twig: And therefore generally; (I speake it of Species, not of Individuals;) Creatures that are large in Boay, are longer liv'd than those that are small, unlesse there be some other potent Cause to hinder it.

Alimentation, or Nourishment; And the way of Nourishing.

The Historie.

To the 4.
Artic.

Nourishment ought to be of an Inferiour nature, and more simple substance, than the thing nourished. *Plants* are nourished with the Earth and Water; *Living Creatures* with *Plants*; *Man* with *Living Creatures*: There are also certaine *Creatures* feeding upon *Flesh*; And *Man* himselfe, takes *Plants*, into a part of his Nourishment: But *Man*, and *Creatures* feeding upon *Flesh*, are scarcely nourished with *Plants* alone. Perhaps, *Fruits*, or *Graines*, baked, or boyled, may, with long use, nourish them; But *Leaves*, of *Plants*, or *Herbs*, will not doe it; As the Order of the *Foliatanes* shewed by Experience.

Over-great Affinity, or Consubstantiality of the Nourishment, to the Thing nourished, proveth not well: for *Creatures*, feeding upon *Herbs*, touch no *Flesh*; And of *Creatures* feeding upon *Flesh*, few of them eat their own kinde. As for *Men*, which are *Cannibals*, they feed not ordinarily upon *Mens* *Flesh*; But reserve it as a Dainty, either to serve their Revenge upon their Enemies, or to satisfie their Appetite at some times. So the Ground is best sowne, with *Seed* growing else-where; And *Men* doe not use to Graft, or Inoculate, upon the same stocke.

By how much the more the Nourishment is better Prepared, and approacheth nearer in likenesse to the Thing nourished; By so much the more, are *Plants* more Fruitfull; And *Living Creatures* in better liking, and plight. For a young *Slip*, or *Cions*, is not so well nourished, if it be pricked into the Ground; As if it be grafted into a Stocke, agreeing with it in Nature; And where it findes the Nourishment already digested, and prepared: Neither, (as is reported,) will the *Seed* of an *Onion*, or some such like, sown in the bare earth, bring forth so large a Fruit, as if it be put into another *Onion*; Which is a new kinde of Grafting; Into the Root, or under ground: Againe, it hath been found out lately; That a *Slip* of a *Wilde tree*; As of an *Elme*, *Oake*, *Asb*, or such like, grafted into a Stock of the same kinde, will bring forth larger Leaves, than those that grow without Grafting: Also *Men* are not nourished so well with Raw *Flesh*, as with that which hath passed the Fire.

Living Creatures are nourished by the Mouth; *Plants* by the Root; *Young ones* in the Wombe, by the Navill: *Birds*, for a while, are nourished with the Yolke in the Egges; whereof some is found in their Croops, after they are hatched.

All Nourishment moveth, from the Center, to the Circumferences; Or, from the Inward, to the Outward; yet it is to be noted; That in *Trees*, and *Plants*, the Nourishment passeth, rather by the Barke, and outward Parts, than by the Pith, and inward parts: For if the Barke bee pilled off, though but for a small bredth, round, they live no more: And the blood in the Veines of *Living Creatures*, doth no lesse nourish the *Flesh* beneath it, than the *Flesh* above it.

In all Alimentation, or Nourishment, there is a two-fold Action; Extrusion, and Attraction: whereof the former proceeds from the Inward Function, the latter from the Outward.

Vegetables assimilate their Nourishment simply, without Excerning: For Gums, and Teares of trees, are rather Exuberances, than Excrements: And knots, or knobs, are nothing but Diseases. But the substance of *Living Creatures* is more perceptible, of the like; And therefore it is conjoynd with a kind of Disdain; whereby it rejecteth the bad, and assimilateth the good.

It is a strange thing, of the *Stalkes* of *Fruits*; That all the Nourishment, which produceth, sometimes, such great Fruits, should bee forced to passe thorow so narrow Necks: For the Fruit is never joyn'd to the Stock, without some stalke.

It is to be noted; That the Seeds of *Living Creatures* will not be fruitfull, but when they are new shed; but the Seeds of *Plants*, will bee fruitfull a long time, after they are gathered. Yet the Slips, or Cions of trees, will not grow, unlesse they bee grafted green; Neither wil the Roots keep long fresh, unlesse they be covered with earth.

In *Living Creatures* there are Degrees of Nourishment, according to their Age: In the Wombe, the young one is nourished with the Mothers blood; when it is new born, with Milke; Afterwards with Meats, and Drinks; And in old Age, the most Nourishing, and Savourie Meats, please best.

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Above all, it maketh to the present *Inquisition*; To inquire diligently, and Attentively whether a Man may not receive *Nourishment* from without; At least some other way, beside the Mouth? Wee know, that Baths of Milke are used in some *Hedick Fevers*, and when the Body is brought extreme low; And *Physitians* doe prescribe *Nourishing Clysters*: This Matter would be well studied; For if *Nourishment* may be made, either from without, or some other way, than by the Stomach; Then the weaknesse of Concoction, which is incident to old Men, might be recompenced by these Helps; And Concoction restored to them, intire.



Length and Shortnesse of Life in Man.

The Historie.

To the 5, 6,
7, 8, 9, and
11. Article.

1.

BEfore the *Flood*, as the *Sacred Scriptures* relate, Men lived many Hundred yeares: Yet none of the *Fathers* attained to a full Thousand. Neither was this *Length of Life*, peculiar only to *Grace*, or the *Holy Line*; For there are reckoned of the *Fathers*, untill the *Flood*, eleven Generations; But of the Sons of *Adam*, by *Cain*, only eight Generations; So as the *Posteritie* of *Cain* may seem the longer liv'd. But this *Length of Life*, immediately after the *Flood*, was reduced to a Moitie; But in the *Post-Nati*: For *Noah*, who was borne before, equalled the Age of his Ancestours; And *Sem* saw the six hundredth yeare of his life. Afterward, three Generations being run from the *Flood*; The *Life of Man* was brought downe, to a Fourth Part of the *Primitive Age*; That was, to about two Hundred yeares.

2.

Abraham lived an hundred seventie and five yeares: A Man of an High Courage, and prosperous in all things. *Isaac* came to an hundred and eightie yeares of Age; A chaste Man, and enjoyed more *Quietnesse*, than his Father. But *Jacob* after many *Crosses*, and a numerous progenie, lasted to the Hundred fortie seventh yeare of his Life; A Patient, Gentle, and wise Man. *Ismael*, a Military Man, lived an Hundred thirtie and seven yeares. *Sarah* (whose yeares only amongst women, are recorded) died in the Hundred twentie seventh yeare of her Age: A Beautifull, and Magnanimous Woman; A singular good Mother, and Wife; And yet, no lesse Famous, for her Libertie, than *Obsequiousnesse* towards her Husband. *Ioseph* also, a Prudent, and Politicke Man, Passing his youth in Affliction, afterwards advanced to the Height of Honour and Prosperitie, lived an hundred and ten yeares. But his Brother *Levi*, elder than himselfe, attained to an hundred thirty seven yeares; A Man Impatient of Contumely, and Revengfull. Neare unto the same Age, attained the Sonne of *Levi*; Also his Grand Child; The Father of *Aaron*, and *Moses*.

3.

Moses lived an Hundred and Twenty yeares: A Stout Man, and yet the *Meekest* upon the Earth; And of a very *Slow Tongue*. Howsoever *Moses*, in his *Psalme*, pronounceth, That the life of Man is but seventie yeares; And if a Man have Strength, then eighty; Which Terme of Mans Life standeth firme, in many Particulars, even at this Day. *Aaron*, who was three yeares the Elder, died the same yeare, with his Brother. A Man of a readier Speech, of a more facile Disposition, and lesse Constant. But *Phineas*, Grandchild of *Aaron* (Perhaps, out of extraordinary Grace,) may be collected, to have lived three hundred yeares; If so be, the War of the *Israelites*, against the Tribe of *Benjamin*; (In which Expedition, *Phineas* was consulted with) were performed in the same order of Time, in which the *History* hath ranked it: he was a Man of a most *Eminent Zeale*. *Ioshua*, a Martiall Man, and an excellent Leader, and evermore victorious, lived to the Hundred and Tenth yeare of his Life. *Caleb* was his Contemporary; And seemeth to have beene of as great yeares. *Ehud* the Judge, seemes to have beene no lesse than an hundred yeares old; In regard, that after the Victory over the *Moabites*, the *Holy land* had rest, under his Government, eightie yeares: He was a Man Fierce, and undaunted; And one, that in a fort, neglected his Life for the good of his People.

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Iob lived, after the Restauration of his Happinesse, an Hundred and Fortie yeares; Being, before his Afflictions, of that Age, that he had sons at Mans Estate: A Man Politick,

litick,, Eloquent, Charitable, and the *Example of Patience*. *Eli* the Priest lived Ninety eight yeares, A corpulent Man, Calme of disposition, and Indulgent to his children. But *Elizeus* the Prophet, may seeme to have died, when he was above an hundred yeares old; For he is found to have lived after the *Assumption* of *Elias*, sixty yeares; And at the Time of that *Assumption*, he was of those yeares, that the Boyes mocked him, by the name of *Bald-head*: A Man vehement, and severe, and of an Austere life, and a Contemner of Riches. Also *Isaiab* the Prophet seemeth to have been an Hundred yeares old, For he is found, to have exercised the Function of a Prophet, Seventie yeares together; The yeares, both of his Beginning to Prophecie, and of his Death, being uncertain: A Man of an Admirable Eloquence; An *Evangelicall Prophet*; Full of the Promises of God, of the *New Testament*, as a Bottle with sweet Wine.

Tobias the Elder, lived an Hundred fifty eight yeares; The younger, an Hundred twenty seven; Mercifull Men, and great Almes-Givers. It seemes, in the time of the *Captivitie*, many of the *Jewes*, who returned out of *Babylon*, were of great yeares: Seeing they could remember both *Temples* (there being no lesse than seventie yeares betwixt Them;) And wept for the unlikenesse of Them. Many ages after that, in the Time of our *Saviour*, lived old *Simeon*, to the age of Ninety yeares: A Devout Man, and full, both of Hope, and Expectation. Into the same time also, fell *Anna* the Prophetesse; who could not possibly bee lesse than an Hundred yeares old: For shee had been seven years a Wife; about eighty foure yeares a Widow; Beside the yeares of her Virginitie; And the time that she lived after her Prophecie of our *Saviour*. She was an Holy Woman; And passed her daies in fastings and Prayers.

The *Long Lives* of Men, mentioned in *Heathen Authors*, have no great certaintie in Them: Both for the Intermixture of Fables, whereunto those kind of Relations were very prone; and for their false Calculation of yeares. Certainly, of the *Egyptians*, we finde nothing of Moment in those workes that are extant, as touching *Long Life*; For their *Kings*, which reigned longest, did not exceed fifty, or five and fiftie yeares, which is no great matter; Seeing many at this day, attaine to those yeares. But the *Arcadian Kings*, are fabulously reported to have lived very long. Surely, that Country was Mountainous, Full of Flocks of Sheepe, and brought forth most wholesome Food. Notwithstanding, seeing *Pan* was their God, wee may conceive, that all Things about them were *Panicke*, and vaine, and subject to Fables.

Numa, King of the *Romans*, lived to eightie yeares; A Man peaceable, Contemplative, and much devoted to Religion. *Marcus Valerius Corvinus*, saw an hundred years compleat; There being betwixt his first and Sixth *Consulship*, Forty six yeares; A Man Valorous, Affable, Popular, and alwaies Fortunate.

Solon of *Athens*, the *Lawgiver*, and one of the seven *Wise men*, lived above eighty yeares; A Man of an High Courage, but Popular, and affected to his Country: also Learned, given to Pleasures, and a soft kind of Life. *Epimenides* the *Cretian* is reported to have lived an hundred fifty seven yeares: The Matter is mixt with a *Prodigious Relation*; For fifty seven of those yeares, he is said to have slept in a *Cave*. Halfe an Age after, *Xenophanes* the *Colophonian*, lived an hundred and two yeares, or rather more; For at the Age of Twenty five yeares he left his Country; Seventy seven compleat yeares he travelled; And after that returned: But how long he lived after his returne, appeares not: A Man, no lesse wandering in Mind, than in Body; For his Name was changed, for the Madnesse of his Opinions, from *Xenophanes* to *Xenomanes*: A Man, no doubt, of a vast Conceit, and that minded nothing but *Infinitum*.

Anacreon, the Poet, lived eighty yeares, and somewhat better: a man Lascivious, Voluptuous, and given to Drinke. *Pindarus*, the *Theban*, lived to eighty yeares; a Poet of an high Fancie, singular in his Conceits, and a great Adorer of the *Gods*. *Sophocles* the *Athenian*, attained to the like Age; A lofty Tragicke Poet, given over wholly to Writing, and Neglectfull of his Family.

Artaxerxes, King of *Persia*, lived ninety foure years: A Man of a Dull wit, Averse to the Dispatch of Businesse, Desirous of glory, but rather of Ease. At the same time lived *Agefilas*, King of *Sparta*, to eighty foure years of Age: a moderate Prince; As being a *Philosopher* amongst *Kings*, But notwithstanding Ambitious, and a Warrior; And no lesse stout in Warre than in Businesse.

Gorgias, the *Sicilian*, was an hundred and eight yeares old; A *Rhetorician*, and a great Boaster of his Facultie; One that taught Youth for profit; Hee had scene many Countries;

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Countries; And a little before his Death said, That hee had done nothing worthy of blame, since he was an old Man. *Protagoras* of *Abdera*, saw Ninetic yeares of Age; This Man was likewise a *Rhetorician*; But professed not so much to teach the Liberall Arts, as the Art of Governing Common-wealths, and States: Notwithstanding, he was a great Wanderer in the World, no lesse than *Gorgias*. *Isocrates*, the *Athenian*, lived Ninety eight yeares: He was a *Rhetorician* also, but an exceeding modest Man, One that shunned the Publike Light; and opened his Schoole only in his owne Houe. *Democritus* of *Abdera*, reached to an hundred and nine yeares: Hee was a great Philosopher; And, if ever any Man amongst the *Grecians*, a true *Naturalist*: A Surveyour of many Countries, but much more of Nature; also a diligent searcher into Experiments; and (as *Aristotle* objected against him) One that followed Similitudes, more than the Laws of Arguments. *Diogenes* the *Sinopean*, lived ninety yeares: A Man, that used Liberty towards others, but Tyranny over Himselfe; of a course Diet, and of much Patience. *Zeno* of *Citium*, lacked but two yeares of an hundred: A man of an high Minde, and a Contemner of other mens opinions; also of a great Acutenesse, but yet not troublesome, choosng rather to take Mens Minds, than to enforce them: The like whereof afterward was in *Seneca*. *Plato* the *Athenian*, attained to eighty one yeares; a man of a great Courage, but yet a Lover of Ease; In his Notions Sublimed, and full of Fancie; Neat and Delicate in his Life; Rather Calme, than Merry; and one, that carried a kinde of Majestie in his Countenance. *Theophrastus* the *Etesian*, arrived at 85. yeares of Age; A Man sweet for his eloquence; sweet for the Varietie of his Matters; & Who selected the pleasant Things of Philosophy; & let the Bitter & Harsh goe. *Carnades* of *Cyrene* many yeares after, came to the like age, of eightie five yeares: A Man of a fluent Eloquence; and one, who by the acceptable, and pleasant Varietie of his Knowledge, delighted, both himselfe, and others. But *Orbilius*, who lived in *Cicero's* time; No Philosopher, or *Rhetorician*; But a *Grammarian*; Attained to an hundred yeares of Age: He was first a Souldier, then a Schoole-master; A man by nature tart, both in his Tongue, and Pen; and severe towards his Schollers.

12. *Quintus Fabius Maximus*, was *Augur* sixtie three yeares; which shewed him to be above eighty yeares of Age, at his Death: Though it bee true, that in the *Augurship*, Nobilitie was more respected, than Age. A wise Man, and a great *Deliberatour*, and in all his proceedings Moderate, and not without Affabilitie severe. *Masinissa*, King of *Numidia*, lived ninetic yeares; And being more than eightie five, got a Sonne: a Daring Man, and trusting upon his Fortune; who in his youth, had tasted of the Inconstancie of Fortune; But in his succeeding age, was constantly happy. But *Marcus Porcius Cato*, lived above nintie yeares of Age: a man of an Iron body and minde; Hee had a bitter Tongue, and loved to cherish factions: Hee was given to Husbandry; and was to Himselfe, and his Family, a Physitian.

13. *Terentia*, *Cicero's* wife, lived an hundred and three yeares: a woman afflicted with many Crosses; First, with the Banishment of her Husband; Then with the Difference betwixt them; Lastly, with his last Fatall Misfortune: She was also oftentimes vexed with the Gout. *Luceia* must needs exceed an hundred, by many yeares; For it is said, That shee acted, an whole hundred yeares, upon the stage; at first, perhaps, representing the the person of some young Girle; at last, of some Decrepit old Woman. But *Galeria Copiola*, A Player also, and a Dancer, was brought upon the Stage as a Novice, in what yeare of her Age, is not known; but ninetic nine yeares after, at the Dedication of the Theater, by *Pompey the Great*, she was shewne upon the Stage againe; Not now for an Actresse, but for a wonder; Neither was this all, for after that, in the Solemnities, for the Health and Life of *Augustus*, she was shewne upon the Stge the third time.

14. There was another Actresse, somewhat Inferiour in age, but much Superiour in Dignity, which lived well-neare ninety yeares: I meane *Livia Iulia Augusta*, wife to *Augustus Caesar*, and Mother to *Tiberius*. For if *Augustus* his Life were a play; (as himselfe would have it; when as upon his Death-bed, hee charged his Friends, they should give him a *Plaudite*, after he was Dead,) certainly this Lady was an excellent Actresse; who would carrie it so well with her Husband, by a dissembled Obedience; and with her Sonne, by power and authoritie: a woman affable, and yet of a Matronall Carriage, Pragmaticall, and upholding her power. But *Iunia*, the wife of *Caius Cassius*, and sister of *Marcus Brutus*, was also ninetic yeares old; For shee survived the *Philippick Battaile*, sixty four yeares: a Magnanimous woman; In her great wealth
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Happy ; In the Calamity of her husband, and neare Kinsfolks, and in a long widowhood, unhappy ; Notwithstanding much honoured of all.

The yeare of our Lord seventy six, falling into the Time of *Vespasian*, is Memorable; In which we shall finde, as it were, a *Calender*, of long-liv'd Men : For that year, there was a *Taxing* ; (Now a *Taxing*, is the most Authentically, and truest Informer, touching the ages of men ;) And in that part of *Italy*, which lieth betwixt the *Apennine Mountains*, and the *River Po*, there were found, an hundred and foure and twentie persons; that either equalled, or exceeded , an hundred yeares of Age: Namely, of an hundred yeares just, fittie foure persons ; Of an hundred and ren, fittie seven persons; Of an hundred and five and twenty, Two only; Of an hundred and thirty, foure men; Of an hundred and five and thirtie , or seven and thirtie , foure more; Of an hundred and fortie, three men . Besides these , *Parma* in particular , afforded five, whereof three fulfilled an hundred and twentie yeares; and two, an hundred and thirty: *Bruxells* afforded one, of an hundred and twentie five yeares old: *Placentia* one, aged an hundred thirtie and one: *Paventia*, one Woman, aged one hundred thirtie and two: A certaine Towne, then called *Velleiacium* , situate in the *Hills*, about *Placentia*, afforded ten; whereof six fulfilled an hundred and ten yeares of age; Foure, an hundred and twentie: Lastly *Rimino* one, of an hundred and fittie yeares ; whose Name was *Marcus Apolinus*.

That our Catalogue might not be extended too much in length, wee have thought fit, as well in those whom we have rehearsed, as in those whom we shall rehearse, to offer none under eighty yeares of Age. Now wee have affixed to every one a true and short Character, or Elogie; But of that sort, whereunto, in our Judgement Length of Life (which is not a little subject to the Manners and fortunes of men) hath some Relation: And that in a twofold Respect: Either that such kinde of Men, are for the most part long liv'd ; Or that such Men may sometimes bee of long life, though otherwise not well disposed for it.

Amongst the *Roman* and *Grecian Emperours* ; Also the *French* and *Almaine* ; To these our Dayes; which make up the Number of well neere two hundred Princes ; There are only foure found, that lived to eighty yeares of Age, unto whom we may adde the two first Emperours; *Augustus*, and *Tiberius*; whereof the latter fulfilled the seventie and eighth yeare, the former the seventie and sixth yeare of his age, and might both perhaps have lived to fourescore, if *Livia* and *Caius* had been Pleased. *Augustus* (as was said) lived seventie and six yeares: A man of moderate Disposition; In accomplishing his Designes, vehement, but otherwise Calme , and Serene ; In meat and drink sober, In Venerie Intemperate ; Through all his life time Happy: and who about the thirtieth year of his life , had a great and dangerous sicknesse; Insomuch that they despaired of Life in him; whom *Antonius Musa* the Physitian , when other Physicians had applied hot Medicines , as most agreeable to his Disease, on the contrarie cured with cold Medicines; which perchance might be some help, to the prolonging of his Life; *Tiberius* lived to be two yeares older: A man with Leane chaps ; as *Augustus* was wont to say; For his speech stuck within his Jawes, but was weightie; Hee was bloudy, a Drinker , and one that tooke lust into a part of his Diet: Notwithstanding , a great Observer of his Health; Insomuch , that hee used to say; That he was a foole, that after thirtie yeares of Age , tooke advice of a Physitian. *Gordian* the Elder, lived eightie yeares; And yet died a violent Death, when he was scarce warme in his Empire: A man of an high spirit , and Renowned; Learned , and a Poet; And constantly happy, throughout the whole course of his Life , save only, that he ended his dayes by a violent Death. *Valerian* the Emperour, was seventie six yeares of Age, before he was taken Prisoner , by *Sapor King Persia*: After his Captivitie hee lived seven yeares in Reproches; And then died a violent Death also: A man of a poore Minde , and not valiant; Notwithstanding lifted up in his owne , and the opinion of Men, but falling short in the performance. *Anastasius* , surnamed *Dicorus*, lived eightie eight yeares: He was of a settled minde, but too abject and superstitious, and fearefull. *Anicius Justinianus* lived to eightie three yeares: a man Greedy of Glorie ; performing nothing in his own person, but in the valour of his Captains Happie and renowned; Uxorious; And not his own Man, but suffering others to lead him. *Helena* of *Britaine*, mother of *Constantine the Great*, was four-score yeares old : a woman, that intermeddled not in matters of state, neither in her husbands, nor sons reign; but devoted her self wholly to Religion; magnanimous, & perpetually flourishing. *Theodora* the Empreffe (who was Sister to *Zoes*, wife

wife of *Monomachus*; And reigned alone after her Decease;) lived above eighty yeares: A Pragmaticall Woman; and one that tooke Delight in Governing; Fortunate in the highest degree, and through her good Fortunes Credulous.

17.

We will proceed now from these *Secular Princes*, to the *Princes in the Church*. *S. Iohn* an Apostle of our *Saviour*, and the *Beloved Disciple*, lived ninety three years: He was rightly denoted under the *Embleme* of the *Eagle*, for his piercing sight into the *Divinity*; And was as a *Seraph* amongst the *Apostles* in respect of his *Burning Love*. *Saint Luke* the *Evangelist*, fulfilled fourescore and foure yeares: An *Eloquent Man*; And a *Traveller*; *Saints Paul*s inseparable Companion; And a *Physitian*. *Simeon* the *Sonne of Cleophas*, called the *Brother of our Lord*, and *Bishop of Hierusalem*, lived an hundred and twenty yeares; though hee was cut short by *Martyrdome*; A *Stout Man*, and *Constant*, and full of *Good works*. *Polycarpus*, *Disciple* unto the *Apostles*, and *Bishop of Smyrna*, seemeth to have extended his *Age*, to an hundred yeares, and more; Though he were also cut off by *Martyrdome*: A *Man of an High Minde*, of an *Heroicall patience*, and *unwearied with Labours*. *Dionysius Areopagita*, *Contemporary* to the *Apostle S. Paul*, lived ninetic yeares: Hewas called, *The Bird of Heaven*, for his high flying *Divinitie*: And was famous, as well for his *Holy Life*, as for his *Meditations*. *Aquila* and *Priscilla*, first *Saint Paul* the *Apostles* *Hosts*; Afterward his *Fellow-Helpers*; lived together in an happy and famous *Wedlock*, at least, to an hundred years of *Age* a peece: For they were both alive, under *Pope Xystus* the *First*: A *Noble paire*, and prone to all kinde of *Charitie*; who amongst other their *Comforts*; (which no doubt were great, unto the first *Founders* of the *Church*;) Had this added; To enjoy each other so long, in an happy *Marriage*. *Saint Paul*, the *Hermite*, lived an hundred and thirteen yeares: Now he lived in a *Cave*; His diet was so slender, and strict, that it was thought almost impossible, to support *Humane Nature* therewithall: He passed his yeares onely in *Meditations*, and *Soliloquies*; yet hee was not *Illiterate*, or an *Idiot*, but *Learned*. *Saint Anthony*, the first *Founder of Monks*, or (as some will have it,) the *Restorer* onely; Attained to an hundred and five yeares of *Age*: A *Man Devout*, and *Contemplative*; Though not unfit for *Civill Affairs*: His *Life* was *Austere*, and *Mortifying*; Notwithstanding hee lived in a kinde of glorious solitude; And exercised a *Command*; For he had his *Monks* under him; And besides, many *Christians* and *Philosophers* came to visit him, as a living *Image*, from which they parted not without some *Adoration*. *Saint Athanasius* exceeded the term of eighty yeares: A *Man of an Invincible Constancy*; *Commanding Fame*, and not yeelding to *Fortune*; Hee was free towards the *Great ones*; With the people *Gracious*, and *acceptable*; *Beaten* and *practised* to *Oppositions*; And in delivering himselfe from them, *stout*, and *wise*. *Saint Hierome*, by the consent of most *Writers*, exceeded ninety yeares of *Age*: A *man powerfull* in his *Pen*, and of a *Manly Eloquence*; *Varioussly learned*, both in the *Tongues*, and *Sciences*; Also a *Traveller*, and that lived strictly towards his old *Age*; In an *estate private*, and not dignified; he bore high *Spirits*, and shined far out of *Obscurity*.

18.

The *Popes* of *Rome*, are in *Number* to this *Day*, two hundred fortie and one: Of so great a *Number*, five onely have attained to the age of fourescore years, or upwards. But in many of the first *Popes*, their full age was intercepted by the prerogative and crown of *Martyrdome*. *Iohn* the twenty three, *Pope of Rome*, fulfilled the ninetieth yeare of his age: A *man of an unquiet Disposition*, and one that studied *Noveltie*: Hee altered many *Things*, some to the *Better*, others onely to the *New*; a great *accumulatour* of *Riches* and *Treasures*. *Gregory*, called the twelfth, created in *Schisme*, and not fully acknowledged *Pope*; Died at ninety yeares; Of him, in respect of his short *Papacie*, we finde nothing, to make a judgement upon. *Paul* the third, lived eighty yeares and one: a *temperate man*, and of a *profound wisdom*; hee was *Learned*, an *Astrologer*; and one that tended his health carefully; But after the *Example* of old *Eli* the *Priest*, over-*Indulgent* to his *Family*. *Paul* the fourth, attained to the age of eighty three years: a *man of an Harsh nature*, and *severe*; of an *haughty Minde*, and *Imperious*; prone to *anger*; his *speech* was *Eloquent*, and *Ready*. *Gregorie* the thirteenth, fulfilled the like age, of eighty three yeares: an *absolute good Man*; *Sound in Mind*, and *Bodie*; *Politick*, *Temperate*, full of *good works*, and an *almes-giver*.

19.

Those that follow are to be more promiscuous in their order; More doubtfull in their *Faith*; & more barren of *Observation*. *King Arganthonius*, who reigned at *Cadez* in *Spain*,

Spain, lived an hundred and thirty ; Or, (as some would have it,) an hundred and forty yeares ; Of which he reigned eighty. Concerning his Manners, Institution of his Life, and the time wherein he reigned, there is a generall Silence. *Cyniras*, King of *Cyprus*, Living in the *Island*, then termed the *Happy* and *Pleasant Island*, is affirmed to have attained to an hundred and fifty, or sixty yeares. Two *Latine Kings* in *Italy*, the *Father*, and the *Sonne*, are reported to have lived, the one eight hundred, the other six hundred years : But this is delivered unto us by certaine *Philologists* ; Who though otherwise credulous enough ; yet themselves have suspected the Truth of this Matter, or rather condemned it. Others record some *Arcadian Kings* to have lived three hundred years : The country, no doubt, is a place apt for long life ; But the Relation I suspect to be fabulous. They tell of one *Dando*, in *Illyrium* ; That lived, without the Inconveniencies of old Age, to five hundred yeares. They tell also of the *Epians*, a Part of *Aetolia* ; That the whole Nation of them were exceeding long liv'd ; Infomuch, that many of them were two hundred years old : And that one principal Man amongst them named *Litorius*, a Man of a Giant-like Stature, could have told three hundred yeares. It is recorded that in the top of the Mountaine *Imolus*, antiently called *Tempe-sis*, many of the Inhabitants lived to an hundred and fifty yeares. Wee read that the Sect of the *Esseans*, amongst the *Jews*, did usually extend their Life to an hundred yeares : Now that Sect used a single, or Abstemious Diet ; After the Rule of *Pythagoras*. *Apollonius Tyaneus* exceeded an hundred yeares ; His Face bewraying no such Age ; He was an admirable Man ; Of the *Heathens* reputed to have something Divine in him ; Of the *Christians*, held for a Sorcerer : In his Dyet *Pythagoricall* ; A great Traveller ; Much Renowned ; And by some adored as a God : Notwithstanding, towards the end of his life, he was subject to many Complaints against him, and Reproaches ; All which he made shift to escape. But lest his long Life should be imputed to his *Pythagoricall* Diet, and not rather that it was Hereditary, his Grandfather before him, lived an hundred and thirty yeares. It is undoubted, that *Quintus Metellus* lived above an hundred yeares ; And that after severall *Consulships* happily administred ; In his old Age he was made *Pontifex Maximus* ; And exercised those Holy Duties full two and twentie yeares ; In the performance of which Rites, his Voice never failed, nor his Hand trembled. It is most certaine, that *Appius Cacus* was very old, but his yeares are not extant ; The most part whereof he passed, after he was Blinde : Yet this Misfortune no whit softned him, but that he was able to governe a numerous Family, a great Retinue, and Dependance, yea, even the Common-wealth it selfe, with great Stoutnesse. In his extreme old Age, he was brought in a Litter into the *Senate-house* ; And vehemently dissuaded the Peace with *Pyrrhus* : The beginning of his Oration was very Memorable, shewing an Invincible Spirit, and strength of Minde ; I have, with great Griefe of Minde, (Fathers Conscript,) these many yeares borne my Blindnesse ; But now I could wish, that I were Deafe also ; when I heare you speake to such Dishonourable Treaties. *Marcus Perpenna* lived ninety eight years ; Surviving all those, whose Suffrages he had gathered, in the *Senate-House*, being *Consul* ; I meane, all the *Senators* at that time. As also all those, whom a little after, being *Censour*, he chose into the *Senate* ; Seven onely being excepted. *Hiero*, King of *Sicily*, in the time of the second *Punick Warre*, Lived almost an hundred yeares ; A man Moderate, both in his Government, and in his Life ; A Worshipper of the Gods, and a Religious conservor of Friendship ; Liberall, and constantly Fortunate. *Statilia*, descended of a Noble Family, in the daies of *Claudius*, lived ninety nine yeares. *Clodia*, the Daughter of *Osilius*, an hundred and fiftene. *Xenophilus*, an Ancient Philosopher, of the Sect of *Pythagoras*, attained to an hundred and six yeares : Remaining healthfull, and vigorous in his old Age ; And famous amongst the Vulgar, for his Learning. The *Islanders* of *Corcyra*, were Anciently accounted Long liv'd ; But now they live after the rate of other Men. *Hypocrates Cous*, the Famous Physician, lived an hundred and four years ; And approved, and credited his own Art, by so long a life : A Man, that coupled learning and wisdom together ; Very conversant in Experience and Observation ; One that hunted not after Words or Methods ; But severed the very Nerves of Science, and so propounded them. *Demonax*, a Philosopher, not onely in Profession, but Practise, lived in the daies of *Adrian*, almost to an Hundred yeares : A Man of an high Minde, and a Vanquisher of his own Minde ; And that, truly, and without Affectation ; A Contemner of the World, and yet Civill and Courteous : When his Friends spake to him, about his Buriall, hee said ; Take no Care for my Buriall ; For Stench will bury a Carkasse : They replied ; Is it your

Minde then, to be cast out to Birds, and Dogs? He said againe, Seeing, in my life time, I endeavourd to my untermost, to benefit Men, what hurt is it, if, when I am dead, I benefit beasts? Certain Indian People, called *Pandora*, are exceedingly long liv'd; Even to no lesse than two hundred yeares. They adde a thing more Marvellous; That having, when they are boyes, an Haire, somewhat whitish; In their old age, before their gray haire, they grow coale blacke: Though indeed this be every where to be seene; that they which have white Haire, whilst they are Boyes, in their Mans estate, change their Haires into a Darker colour. The *Seres*, another People of *India*, with their Wine of *Palmes*, are accounted Long-Livers; Even to an hundred and thirty yeares. *Euphranor*, the *Grammarian*, grew old in his Schoole; And taught Schollers, when he was above an hundred yeares old. The *Elder Ovid*, Father to the *Poet*, lived Ninety yeares: Differing much from the disposition of his Sonne; For hee contemned the *Muses*, and dissuaded his Sonne from *Poetry*. *Asinius Apollio*, intimate with *Augustus*, exceeded the Age of an hundred yeares: A Man of an unreasonable Profusenesse, Eloquent, a Lover of Learning; But Vehement, Proud, Cruell; And one that made his Private Ends the Center of his Thoughts. There was an Opinion, that *Seneca*, was an extreame Old Man; No lesse than an Hundred, and fourteene yeares of Age: which could not possibly be; It being as improbable, that a Decrepit old Man, should bee set over *Neroes* Youth; As, on the contrary, it was true, that hee was able to mannage, with great Dexterity, the Affaires of State: Besides, a little before, in the midst of *Claudius* his Reigne, hee was banished *Rome*, for Adulteries committed with some Noble Ladies; which was a Crime, no way competible with so extreame old Age. *Iobannes de Temporibus*, amongst all the men of our latter Ages, out of a common Fame, and Vulgar Opinion, was reputed Long-liv'd, even to a Miracle; Or rather, even to a Fable; His Age hath been counted, above three Hundred yeares: He was by Nation a French Man; And followed the Warres, under *Charles*, the Great. *Gavius Areline*, Great Grand-Father to *Petrarch*, arrived at the Age of an hundred and foure yeares. Hee had ever enjoyed the Benefit of good Health; Besides; at the last, he felt rather a Decay of his Strength, than any Sicknesse, or Malady; which is the true Resolution, by old Age. Amongst the *Venetians*, there have been found, not a few long Livers; and those of the more eminent sort: *Franciscus Donatus*, Duke; *Thomas Contarenus*, Procurator of Saint Marke; *Franciscus Molinus*, Procurator also of Saint Mark; Others But most Memorable, is that of *Cornarus* the *Venetian*, who being in his youth of a sickly Body; beganne first to eate and drinke by measure to a certaine weight; Thereby to recover his Health; This Cure, turned, by use into a Dyet; That Diet to an extraordinary long Life; Even of an 100 years and better, without any Decay in his Senses; And with a constant enjoying of his Health. In our age *William Postell*, a French Man, lived to an hundred, and well nigh twenty yeares: The top of his Beard on the upper lip, being black, and not grey at all: A man crazed in his Brain, and of a Fancy not altogether sound; A great Traveller, Mathematician, and somewhat stained with Heresie.

20. I suppose there is scarce a Village, with us in *England*, if it be any whit populous, but it affords some Man or Woman of fourescore yeares of age: Nay, a few yeares since, there was in the County of *Hereford*, a Maygame, or Morris-Dance, consisting of Eight Men, whose Age computed together, made up eight hundred yeares; Inso-much, that what some of them wanted of an hundred, others exceeded as much.

21. In the *Hospitall* of *Bethleem*, corruptly called *Bedlam*; in the Suburbs of *London*, there are found, from time to time, many Mad Persons that live to a great Age.

22. The Ages of Nymphs, Fawns, and Satyrs, whom they make to be, indeed, Mortal, but yet exceedingly Long-liv'd; (A Thing, which Ancient Superstition, and the late Credulity of some, have admitted;) wee account but for Fables and Dreames: Especially, being that, which hath neither consent with Philosophy, nor with Divinity. And as touching the History of Long Life in Man, by Individuals, or next unto Individuals, thus much: Now wee will passe on to Observations, by certaine Heads.

23 The Running on of Ages, and Succession of Generations, seeme to have no whit abated from the length of Life: For wee see, that from the time of *Moses*, unto these our Dayes, the terme of Mans life hath stood about Fourescore yeares of Age; Neither hath it declined, (As a man would have thought) by little and little. No doubt, there are Times, in every Country, wherein men are longer, or shorter liv'd.

Longer,

Longer, for the most part, when the times are barbarous, and Men fare lesse deliciously, and are more given to bodily Excercises : Shorter, when the times are more Civill, and Men abandon themselves to Luxury and Ease. But these things passe on by their turnes : The Succession of Generations alters it not. The same, no doubt, is in other living Creatures : For neither Oxen, nor Horses, nor Sheep, nor any the like, are abridged of their wonted Ages at this day. And therefore the Great Abridger of Age was the *Floud* : And perhaps, some such notable Accidents ; (As particular *Inundations*, *Long Droughts*, *Earth-quakes*, or the like,) may doe the same againe. And the like reason is, in the Dimension and Stature of Bodies ; For neither are they lessened by succession of Generations ; Howsoever *Virgil* (following the vulgar Opinion) Divined, that After-Ages would bring forth lesser Bodies, than the then present : whereupon speaking of plowing up the *Emathian*, and *Emenian* Fields, He saith, *Grandiaq; effossis mirabitur ossa sepulchris* ; That after Ages shal admire the great bones digged up in ancient Sepulchers. For whereas it is manifested that there were heretofore men of Gigantine Statures ; (such, as for certain, have been found in *Sicily*, and elsewhere, in ancient Sepulchres, and Caves,) yet within these last three thousand yeares ; A time, whereof we have sure Memory ; Those very Places have produced none such : Although this Thing also hath certaine Turns and Changes, by the Civillizing of a Nation, no lesse than the former. And this is the rather to be noted, because men are wholly carried away with an Opinion ; That there is a continuall Decay by succession of Ages, as well in the Terme of Mans life, as in the Stature and strength of his Body ; And that all things decline, and change to the worse.

In *Cold*, and *Northerne Countries*, Men live longer, commonly, than in *Hot* : which must needs be, in respect ; The Skinne is more compact and close ; And the Juices of the body lesse dissipable ; And the Spirits themselves lesse Eager to consume, and in better disposition to repaire ; And the aire, (as being little heated by the Sun-beams) lesse Predatory. And yet, under the *Æquinoctiall Line*, where the Sunne passeth to and fro, and causeth a double Summer, and double Winter ; And where the Dayes and Nights are more Equall ; (If other Things bee concurring,) they live also very long : As in *Peru*, and *Taprobane*.

Islanders are, for the most part, longer liv'd, than those that live in *Continents* : For they live not so long in *Russia*, as in the *Orcades* ; Nor so long in *Africa*, though under the same *Parallel*, as in the *Canaries*, and *Tercera's* ; And the *Iaponians*, are longer liv'd, than the *Chineses* ; Though the *Chineses* are made upon Long life. And this thing is no marvaile ; Seeing the Aire of the Sea doth heat and cherish in cooler Regions, and coole in hotter.

High Scituations, doe rather afford long Livers, than *Low* ; Especially, if they bee not *Tops of Mountaines*, but *Rising Grounds*, as to their generall Situations : Such as was *Arcadia* in *Greece* ; And that part of *Ætolia*, where we related them, to have lived so long. Now there would be the same Reason, for *Mountaines* themselves, because of the purenesse and clearenesse of the Aire, but that they are corrupted by accident ; Namely, by the Vapours, Rising thither out of the Vallies, and Resting here. And therefore in *Snowy Mountaines* there is not found any Notable long Life ; Not in the *Alps*, not in the *Pyrenean Mountains*, not in the *Apennine* : Yet in the tops of the *Mountaines*, running along towards *Æthiopia*, and the *Abyssines* ; where by reason of the Sands beneath, little or no Vapour riseth to the *Mountaines*, they live long, even at this very Day ; Attaining, many times, to an hundred and fifty yeares.

Marshes, and *Fens*, are Propitious to the Natives, and Malignant to Strangers, as touching the Lengthning, and Shortning of their lives : And that which may seeme more Marvellous, *Salt Marshes*, where the Sea ebs and flows, are lesse wholesome than those of Fresh water.

The *Countries*, which have been observed, to produce long Livers, are these ; *Arcadia*, *Ætolia*, *India* on this side *Ganges*, *Brasil*, *Taprobane*, *Britaine*, *Ireland*, with the *Islands* of the *Orcades*, and *Hebrides* : For as for *Æthiopia*, which by one of the Ancients, is reported to bring forth long Livers ; It is but a Toy.

It is a Secret ; The *Healibfulnesse* of *Aire*, especially in any Perfection, is better found by *Experiment*, than by *Discourse* or *Conjecture*. You may make a Triall by a lock of Wooll, exposed, for a few dayes, in the open Aire, if the weight be not much

increased: Another by a peece of Flesh, exposed likewise; If it corrupt not over-soone: Another by a Weather-Glasse: If the water interchange not too suddenly. Of these and the like enquire further.

30. Not only the *Goodnesse*, or *Purenesse* of the *Aire*, but also the *Equality* of the *Aire*, is Materiall to Long Life. Intermixture of Hills and Dales, is pleasant to the sight, but suspected for Long Life. A Plaine, moderately dry; But yet not over-barren, or Sandy; nor altogether without Trees, and Shade; Is very convenient for Length of Life.

31. *Inequality* of *Aire*, (as was even now said;) in the Place of our Dwelling, is naught; But *Change* of *Aire* by Travelling, after one be used unto it, is good: And therefore great Travellers have beene Long Liv'd. Also those that have lived perpetually in a little Cottage, in the same place, have beene long livers: For *Aire* Accustomed, consumeth lesse; but *Aire* changed, nourisheth, and repaireth more.

32. As the Continuation, and Number of Successions, (which we said before,) makes nothing to the Length or Shortnesse of Life; So the *Immediate Condition* of the Parents, as well the Father, as the Mother, without doubt, availeth much. For some are begotten of old Men, some of Young Men, some of Men of Middle Age; againe, some are begotten of Fathers Healthfull, and well Disposed; Others of Diseased and languishing: Againe, some of Fathers, immediately after Repletion, or when they are Drunke; Others, after Sleeping, or in the Morning: againe, some after a long Intermision of *Venus*; Others upon the act repeated: againe, some in the Fervencie of the Fathers love; (as it is commonly in Bastards;) Others after the Cooling of it, as in long Married Couples. The same things may be considered on the part of the Mother: Unto which must be added, the Condition of the Mother, whilst shee is with child, as touching her Health; as touching her Diet: The time of her Bearing in the Wombe; To the tenth Moneth, or earlier. To reduce these things to a Rule, how farre they may concerne Long Life, is hard: and so much the Harder, for that those things, which a Man would conceive to be the best, will fall out to the contrary: For that Alacrity in the Generation, which begets lusty and Lively Children, will be lesse profitable to long life, because of the Acrimony, and Inflaming of the Spirits. We said before; That to partake more of the Mothers Bloud, conduceth to long Life. Also, wee suppose all things in Moderation, to bee best; Rather Conjugall Love, than Meretricious; The houre for generation to be the morning; a state of body, not too lusty, or full; and such like. It ought also to be well observed; That a strong Constitution in the parents, is rather good for them, than for the Childe; Especially in the Mother. And therefore *Plato* thought, ignorantly enough; That the vertue of Generations halted, because the woman used not the same Exercise, both of Minde and Body, with the men: The contrarie is rather true; For the Difference of vertue, betwixt the Male, and the Female, is most profitable for the Childe; and the Thinner women, yeeld more towards the Nourishment of the Childe; which also holds in Nurses. Neither did the *Spartan women*, which married not before twentie two, or as some say, twentie five; (and therefore were called *Man-like women*;) bring forth a more Generous, or long-liv'd Progenie; Than the *Roman* or *Athenian*, or *Theban women* did, which were ripe for Marriage, at twelve, or fourteene yeares. And if there were any thing eminent in the *Spartans*; That was rather to bee imputed, to the Parsimony of their Diet, than to the late Marriages of their women. But this we are taught by experience; That there are some Races, which are long liv'd, for a few Descents; so that long life, is like some Diseases, a Thing Hereditarie, within certaine Bounds.

33. Faire in Face, or Skin, or Haire, are shorter Livers; Black, or Red, or Freckled, longer. Also too Fresh a Colour in youth, doth lesse promise long life, than Palenesse. A hard skin is a signe of long life, rather than a Soft: But wee understand not this of a Rugged Skin, such as they call the goose skin, which is, as it were, Spongie, but of that which is hard, and Close. A Forehead with deep Furrowes and Wrinkles is a better signe, than a smooth and plaine Forehead.

34. The Haires of the Head hard, and like Bristles, doe betoken longer life, than those that are soft, and Delicate. Curled Haires betoken the same thing, if they bee Hard withall; But the Contrarie, if they bee Soft and shining. The like, if the curling bee rather thick, than in large Bunches.

35. Early, or late, Baldnesse, is an indifferent Thing; Seeing many which have beene

Bald

Bald betimes, have lived long Also early *Gray Haires*, (Howsoever they may seem Forerunners of Old age approaching,) are no sure signes; For many that have grwone gray betimes, have lived to great yeares. Nay, *Hasty Gray Haires*, without *Baldnesse*, is a Token of long Life; contrarily, if they be accompanied with *Baldnesse*.

Hairinesse of the upper Parts, is a signe of short life; and they that have extraordinarie much *Haire* on their Breasts, live not long: but *Hairinesse* of the Lower Parts; as of the Thighes, and Legs, is a signe of long life.

Talnesse of *Stature*, (if it be not Immoderate,) with convenient Making, and too slender; Especially if the body be active withall; Is a signe of long life. Also on the contrarie, Men of low stature live long, if they be not too active, and stirring.

In the proportion of the body; They which are short to the *Wastes*, with long legs, Are longer liv'd than they, which are long to the *Wastes*, and have short Legs: Also they which are large in the Nether parts, and streight in the upper; (The Making of their Body, rising, as it were, into a sharp Figure;) Are longer liv'd than they, that have broad Shoulders, and are slender down-wards.

Leannesse, where the affections are settled, calme, and peaceable; Also a more *Fat* *habit* of Body, joyned with *Choler*, and a Disposition stirring, and peremptorie, signifie long Life; But *Corpulencie* in youth, fore-shewes short life; In Age, it is a thing more Indifferent.

To bee Long, and Slow, in Growing, is a signe of long life; If to a Greater Stature, the Greater signe; If to a lesser Stature yet a signe though: contrarily to grow quickly to a great stature, is an evill signe; If to a small stature, the lesse evill.

Firme Flesh; A Raw-bone body; and veines lying higher than the *Flesh*; Betoken long life: The contrarie to these, short Life.

A Head somewhat lesser than to the proportion of the Body; A moderate Necke, not long, nor slender, nor fat, nor too short, wide *Nostrils*, whatsoever the forme of the Nose be, A large Mouth; an *Eare* Gristly, not Flethy; *Teeth* strong, and contiguous, not small, or thin-set; Foretoken long life: And much more, if some new *Teeth* put forth in our elder yeares.

A broad Breast, yet not bearing out, but rather Bending inwards; *Shoulders* somewhat crooked, and (as they call such persons) round-back'd; a Flat Belly; a Hand large, and with few lines in the *Palme*; a short, and round Foot; *Thighes* not Flethy; and *Calves* of the Leg not hanging over, but neat; are signes of long life.

Eyes somewhat large, and the Circle of them inclined to *Greenesse*; *Senses* not too quick; The pulse in youth slower, towards old age quicker, *Facilitie* of holding the *Breath*, and longer than usuall; the body in youth inclined to bee bound, in the Decline of yeares more *Laxative*; are also signes of long life.

Concerning the *Times* of *Nativity*, as they referre to long life, nothing hath beene observed worthy the setting downe; save only *Astrologicall Observations*, which wee rejected in our *Topicks*. A Birth at the eighth Moneth, is not onely long-lived, but not likely to live. Also winter Births are accounted the longer liv'd.

A *Pythagoricall*, or *Monasticall Diet*, according to strict rules, and alwayes exactly Equall. (as that of *Cornarus* was) seemeth to be very effectuell for long life. Yet on the contrarie, amongst those that live freely, and after the common sort, such as have good *Stomacks*, and feed more plentifully, are ofte n the longest liv'd. The Middle Diet, which wee account the Temperate, is commended, and conduceth to good Health, but not to long life; For the Spare Diet, begets few Spirits, and dull; and so wasteth the body lesse: and the Liberall Diet, yeeldeth more ample nourishment; and so repaireth more: But the Middle Diet, doth neither of both; for where the extreames are Hurtful, there the Meane is best; But where the Extremes are helpfull, there the Meane is nothing worth. Now to that Spare Diet, there are Requisite, *Watching*, lest the spirits being few, should bee oppressed with much sleepe; *Little Exercise*, lest they should exhale; *Abstinence* from *Venerie*, lest they should be exhausted: But to the Liberall Diet, on the other side, are Requisite, Much Sleepe frequent Exercises, and a seasonable use of *Venerie*. Baths, and Anointments, (such as were anciently in use,) did rather tend to Delicousnesse, than to prolonging of life. But of all these things, wee shall speake more exactly, when we come to the *Inquisition*, according to Intentions. Meane while that of *Celsus*, who was not only a Learned Physitian, but a wise Man, is not to be omitted; Who adviseth Interchanging, and Alternation of the Diet, but still with an Inclination to the more Benigne: as that a man should sometimes accustome himselfe to watching

watching, sometimes to sleepe; But to sleepe oftneft: againe, that he should sometimes give himfelfe to fasting; sometimes to feasting; But to Feasting oftneft: That hee should sometimes inure himfelfe to great Labours of the Minde, sometimes to Relaxations of the fame, but to Relaxations oftneft. Certainly, this is without all question; That *Diet* well ordered beares the greateft part in the Prolongation of Life; Neither did I ever meet, an extreme long lived man; But being asked of his courfe, hee observed something peculiar; some one Thing, some another. I remember an *old Man*, above an hundred yeares of Age, who was produced as a witneffe, touching an ancient Prescription; when he had firnished his Testimonie, the *Iudge* familiarly asked him, How he came to live fo long; He answered, befide Expectation, and not without the Laughter of the Hearers; *By Eating before I was Hungry, and Drinking before I was Drie.* But of these things, wee shall speak hereafter.

47. A Life led in *Religion*, and in *Holy Exercises* seemeth to conduce to long life. There are in this kinde of life, these things; Leisure; Admiration and Contemplation of Heavenly things; Joyes not sensuall; Noble hopes; Wholesome Feares; Sweet Sorrowes; Lastly, continuall Renovations, by Observances, Pennances, Expiations; All which are very powerfull to the Prolongation of life. Unto which if you adde that austere Diet, which hardneth the Masse of the Body, and humbleth the spirits, no marvell, if an extraordinary length of life doe follow; such as was that of *Paul the Hermit*, *Simon Stylita* the *Columnar Anchorite*; and of many other *Hermits*, and *Anchorites*.

48. Nex unto this, is the life led in good letters; Such as was that of Philosophers, Rhetoricians, Grammarians. This life is led also in leisure; And in those thoughts, which, seeing they are severed from the affaires of the world, bite not; But rather delight through their Varietie, and Impertinencie. They live also at their pleasure; Spending their time in such Things, as like them best; and for the most part in the company of young men; which is ever the most cheerefull. But in Philosophies, there is great Difference betwixt the sects, as touching long life. For those Philosophies, which have in them a touch of Superstition, and are conversant in high Contemplations, are the best; As the Pythagoricall, and Platonick: Also those, which did institute a perambulation of the world; and considered the Varietie of Naturall Things; and had Retchlesse, and High, and Magnanimous Thoughts; (As of *Infinitum*, of the Stars, of the Heroicall Vertues, and such like;) were good for lengthening of life; such were those of *Democritus*, *Philolaus*, *Xenophanes*, the Astrologians, and Stoicks: Also those, which had no profound speculation in them; but discoursed calmly on both sides, out of common sense, and the Received Opinions, without any sharp Inquisition; were likewise Good; Such were those of *Carneades*, and the *Academicks*; also of the Rhetoricians, and Grammarians. But contrarily, Philosophies conversant in perplexing subtilties; and which pronounced peremptorily; and which examined and wrested all things, to the Scale of Principles; Lastly, which were Thornie, and Narrow; were Evill; such were those commonly of the Peripateticks, and of the Schoolemen.

49. The *Countrie Life*, also, is well fitted, for long life: It is much abroad, and in the open Aire; It is not slothfull, but ever in Employment: It Feedeth upon Fresh Cates, and unbought; It is without Cares, and Envie.

50. For the *Militar Life*, wee have a good opinion of that whilest a man is young: Certainly, many excellent *Warriers* have beene long liv'd; *Corvinus*, *Camillus* *Xenophon*, *Agésilas*; with others, both ancient, and Moderne: No doubt, it furthereth long life, to have all things from our youth, to our Elder age, Mend and grow to the better; That a youth full of Crosses may minister sweetnesse to our Old Age. Wee conceive also, that *Militar Affections*, inflamed with a Desire of Fighting, and Hope of Victory, doe infuse such a Heat into the *Spirits*, as may be profitable for long life.

Medicines for Long Life.

THe Art of Physick, which we now have, looks no further, commonly, than to Conservation of Health, and Cure of Diseases: As for those things which tend properly to Long Life, there is but slight mention, and by the way onely. Notwithstanding wee will propound those Medicines, which are notable in this kinde, I meane, those which are Cordials. For it is consonant to Reason, that those things, which being taken in Cures, doe defend and fortifie the Heart; or, more truly, the Spirits, against Poysons, and Diseases; being transferred with judgement and choyce, into Diet, should have a good effect, in some sort, towards the Prolonging of Life. This we will doe, not heaping them promiscuously together, (as the manner is) but selecting the best.

To the tenth Article.

Gold is given in 3 formes, either in that wch they call *Aurum potable*; or in *Wine* wherein Gold hath been quenched; or in gold in the substance, such as are *Leafe Gold*, and the *Filings of Gold*. As for *Aurum potable*, it is used to be given in desperate or dangerous Diseases; and that not without good successe. But we suppose, that the Spirits of *Salt*, by which the *Gold* is dissolved, doe rather minister that vertue, which is found in it, than the *Gold* it selfe: though this secret be wholly suppressed. Now if the body of *Gold* could be opened, without these *Corrosive waters*; or by these *Corrosive waters*, (so the the venomous quality were wanting) well washed, we conceive it would be no unprofitable medicine.

Pearles are taken either in a fine powder, or in a certain Masse, or Dissolution, by the juyce of sowe and new *Lemons*: And they are given sometimes in Aromaticall Confections, sometimes in Liquor. The *Pearle*, no doubt, hath some affinity with the Shell, in which it groweth, and may be of the same quality with the Shells, of *Crey-Fishes*.

Amongst the *Transparent pretious Stones*, two onely are accounted *Cordiall*; The *Emeraud* and the *Jacinth*; which are given under the same formes, that the *Pearles* are; save only that the dissolutions of them, as farre as we know, are not in use. But we suspect these *Glassy Jewels*, lest they should be cutting.

Of these which we have mentioned, how far, and in what manner they are helpfull, shall be spoken hereafter.

Bezoar Stone is of approved vertue, for refreshing the Spirits, and procuring a gentle Sweat. As for the *Unicornes Horne*, it hath lost the credit with us; yet so, as it may keep Rank with *Harts Horne*; and the *Bone* in the heart of a *Hart*, and *Ivory*, and such like.

Amber Grise, is one of the best to appease and comfort the Spirits.

Hereafter follow the Names onely of the *Simple Cordials*, seeing their Vertues are sufficiently known.

Hot.	Hot.	Cold.	Cold.
<i>Saffron.</i>	<i>Clove Gillyflowers</i>	<i>Nitre.</i>	<i>Juice of sweet</i>
<i>Folium Indum</i>	<i>Orange Flowers.</i>	<i>Roses. Violets.</i>	<i>Oranges.</i>
<i>Lignum Aloes.</i>	<i>Rosemary.</i>	<i>Strawberry-</i>	<i>Juice of Pearmain.</i>
<i>Citron Pill, or</i>	<i>Mint.</i>	<i>leaves.</i>	<i>Borage.</i>
<i>Rinde.</i>	<i>Betony.</i>	<i>Strawberries.</i>	<i>Buglosse.</i>
<i>Balme.</i>	<i>Carduus Benedi-</i>	<i>Juice of sweet</i>	<i>Burnet. Sanders</i>
<i>Basill.</i>	<i>ctus.</i>	<i>Lemons.</i>	<i>Camphire.</i>

Seeing our speech now is of those things, which may be transferred into Diet; All Hot waters, and Chymicall Oyles; (which, as a certain Trifler saith, are under the Planet Mars; and have a Furious and Destructive Force;) As also, all hot, and biting Spices, are to be rejected: and a Consideration to be had, how Waters and Liquors may be made of the Former simples; not those Phlegmatick distilled waters; Nor again those burning waters of Spirits of Wine: But such as may be more temperate, and yet lively, and sending forth a Benigne Vapour.

We make some question touching the frequent letting of Blood, whether it conduceth to long life, or no; and we are rather in the opinion, that it doth, if it be turned into a Habit, and other things be well disposed: For it letteth out the old Juice of the Body, and bringeth in new.

We suppose also, that some *Emaciating Diseases*, well cured, doe profit to long Life; For they yeeld new Iuyce, the old being consumed; And, (as he saith,) *To recover a sicknesse, is to renew youth*: Therefore it were good to make some *Artificiall Diseases*; which is done by strict, and *Emaciating Diets*; Of which we shall speak hereafter.

The Intentions.

To the 12,
13, and 14.
Artic.

HAVING finished the Inquisition, according to the Subjects; As Namely, of Inanimate Bodies, Vegetables, Living Creatures, Man; We will now come nearer to the Matter, and order our Inquisition by certaine Intentions; Such as are true, and proper, (as wee are wholly perswaded;) And which are the very paths to Mortall Life. For in this part, Nothing that is of worth, hath hitherto been inquired; But the Contemplations of Men have been, but simple, and non-proficients. For when we heare Men, on the one side, speake of Comforting Naturall Heate, and the Radicall Moisture; And of Meats, which breed good Bloud; Such as may neither bee Burnt, nor Pblegmatick; And of the Cheering and Recreating of the Spirits; We suppose them, to be no bad Men, which speake these Things: But none of these worketh effectually towards the end. But when, on the other side, we heare severall Discourses; touching Medicines made of Gold, because Gold is not subject to Corruption; And touching Precious Stones, to refresh the Spirits by their hidden Properties, and Lustre: And that, if they could be taken, and retained in Vessels, the Balsames, and Quint-essences of Living Creatures, would make Men conceive a proud hope of Immortalitie: And that the Flesh of Serpents, and Harts, by a certaine consent, are powerfull to the Renovation of Life; Because the one casteth his Skin, the other his Hornes; They should also have added the Flesh of Eagles, because the Eagle changeth his Bill: And that a certain Man, when he had found an Oyntment hidden under the Ground, and had annointed himselfe therewith from Head to Foot; (excepting onely the Soles of the Feet) Did, by his Annointing, live three hundred yeares, without any Disease, save onely some Tumours in the Soles of his Feet: And of Artesius, who when he found his Spirit ready to depart, drew into his Body the Spirit of a certaine young Man; And thereby made him Breathlesse; But Himselfe lived many yeares by another Mans Spirit: And of Fortunate Houres, according to the Figures of Heaven, in which Medicines, are to be gathered, and compounded for the prolongation of Life: And of the Seales of Planets, by which Vertues may be drawne, and fetched downe from Heaven, to prolong Life: And such like fabulous, and superstitious Vanities: Wee wonder exceedingly, that men should so much dote, as to suffer themselves to be deluded with these Things. And againe, we doe pittie Mankinde; That they should have the Hard Fortune, to be besieged with such frivolous, and sencelesse Apprehensions. But our Intentions doe both come home to the Matter; And are farre from vaine and credulous Imaginations: Being also such, as wee conceive, Posteritie may adde much to the Matters, which satisfie those Intentions; But to the Intentions themselves but a little. Notwithstanding there are a few Things, and those of very great Moment, of which we would have Men to bee fore-warned.

First, wee are of that Opinion, that wee esteeme the Offices of Life, to be more worthy than Life it selfe. Therefore, if there be any Thing of that kinde, that may indeed exactly answer our Intentions, yet so, that the Offices, and Duties of Life, bee thereby hindred; Whatsoever it be of this kind, we reject it. Perhaps, we may make some light Mention, of such things but we insist not upon them. For we make no serious, nor diligent Discourse; Either of leading the life in Caves, where the Sun-Beames, and severall changes of the Aire, pierce not; Like Epimenides his Cave; Or of perpetuall Baths, made of Liquors prepared; Or of Shirts, and Seare-cloathes, so applid, that the Body should be alwaies, as it were, in a Box; Or of thicke paintings of the Body, after the manner of some Barbarous Nations; Or of an exact ordering of our Life, and Diet, which aimeth onely at this, and mindeth nothing else, but that a Man live; (As was that of Herodicus, amongst the Ancients; And of Cornarus the Venetian; in our Dayes, but with greater Moderation;) Or of any such Prodigie, Tediousnesse, or Inconvenience: But we propound such Remedies, and Precepts, by which the Offices of Life, may neither be deserted, nor receive any great Interruptions, or Molestations.

Secondly,

Secondly, on the other side, wee denounce unto Men, that they would give over Trifling: And not imagine, that so great a work, as the stopping, and turning back, the powerfull Course of Nature, can be brought to passe by some Morning Draught, or the taking of some precious Drug; But they would be assured, that it must needs be, that this is a worke of labour; And consisteth of many Remedies, and a fit connexion of them amongst themselves; For no man can bee so stupid, as to imagine, that what was never yet done, can be done, but by such wayes, as were never yet attempted.

Thirdly, we ingenuously professe; That some of those things, which we shall propound, have not been tried by us, by way of experiment; (For our Course of life doth not permit that;) But are derived, (as wee suppose) upon good reason, out of one principle and Grounds; (of which some we set downe, others we reserve in our Minde;) And are, as it were, cut, and digged out of the Rocke, and Mine of Nature Her selfe. Neverthelesse, wee have been careful, and that with all providence and Circumspection; (Seeing the Scripture saith of the Body of Man; That it is more worth than Raiment;) To propound such Remedies, as may at least be safe, if peradventure they be not Fruifull.

Fourthly, we would have men rightly to observe, and distinguish; That those things which are good for an Healthfull Life: are not alwaies good for a Long Life. For there are some things which doe further the Alacrity of the Spirits, and the Strength and Vigour of the Functions, which, notwithstanding, do cut off from the summe of Life. And there are other Things, which are profitable to Prolongation of Life; which are not without some Perill of Health, unlesse this Matter be salved by fit Remedies: Of which notwithstanding, as occasion shall be offered, wee will not omit, to give some Cautions, and Monitions.

Lastly, we have thought good, to propound sundry Remedies, according to the severall Intentions; But the choice of those Remedies, and the Order of them, to leave to Discretion. For to set downe exactly, which of them agreeib best, with which Constitution of Body, which with the severall Courses of Life; which with each Mans particular Age; And how they are to be taken, one after another; and how the whole Practique of these Things is to be administred and governed; would both be too long, Neither is it fit to be published.

In the Topicks, we propounded three Intentions. The Prohibiting of Consumption; The Perfecting of Reparation; And the Renewing of Oldnesse. But, seeing those Things, which shall be said, are Nothing lesse than words; Wee will deduce those three Intentions, to Ten Operations.

The first is, the Operation upon the Spirits, that they may renew their Vigour.

The Second Operation is, upon the Exclusion of Aire.

The Third Operation is, upon the Bloud, and the Sanguifying Heat.

The Fourth Operation is upon the Juyces of the Body.

The Fifth Operation is upon the Bowels, for their Extrusion of Aliment.

The Sixth Operation is, upon the Outward Parts, for their Attraction of Aliment.

The seventh Operation is, upon the Aliment it selfe, For the Insinuation thereof.

The Eighth Operation is, upon the last Act of Assimilation.

The Ninth Operation is, upon the Inteneration of the Parts after they begin to be Dried.

The Tenth Operation is, upon the Purging away of Old Juyce, and Supplying of New Juyce.

Of these Operations, the foure first belong to the First Intention; The foure next to the Second Intention; And the two last, to the Third Intention.

But because this Part, touching the Intentions doth tend to Practice; under the Name of Historie, wee will not only comprise Experiments and Observations; but also Counsells, Remedies, Explications of Causes, Assumptions, and whatsoever bath Reference hereunto.

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*The operation upon the Spirits, that they may remain youthfull,
and renue their vigor.*

The History.

THE Spirits are the Master-workmen of all Effects in the Body. This is manifest by consent, and by infinite instances.

If any man could procure, that a young mans *Spirits* could be conveyed into an old mans Body; it is not unlikely, but this great Wheele of the *Spirits*, might turn about the lesser wheele of the *Parts*, and so the course of Nature become retrograde.

In every Consumption, whether it be by Fire, or by Age, the more the *Spirit* of the Body, or the Heat, preyeth upon the Moisture, the lesser is the duration of that Thing. This occurs every where, and is manifest.

The *Spirits* are to be put into such a temperament, and degree of activity; That they should not (as He saith) *Drink* or *Guzzle* the juyces of the Body, but *Sip* them *onely*.

There are two kindes of *Flames*, the one eager and weak, which consumes slight substances, but hath little power over the harder; as the flame of Straw, or small Sticks; The other strong, and constant, which converts hard and obstinate substances, as the flame of hard wood, and such like.

The eager flames, and yet lesse robust, doe dry Bodies, and render them exhaust and saplesse; but the stronger flames do intenerate and melt them.

Also, in *Dissipating Medicines*, some vapour forth the thinner part of the tumours, or swellings; and these harden the tumour: Others potently discusse, and these soften it.

Also in *Purging and Absterging Medicines*, some carry away the fluide humours violently; others draw the more obstinate and viscous.

The *Spirits* ought to be invellid, and armed with such a heat, that they may choose rather to stirre and undermine hard and obstinate matters, than to discharge and carry away the thin and prepared: For by that meanes the body becomes Greene and Solid.

The *Spirits* are so to be wrought and tempered, that they may be in Substance, Dense, not Rare; In Heat, strong, not Eager; In Quantity, Sufficient for the offices of Life, not Redundant, or Turgide; In Motion, appeased, not Dancing, or Unequall.

That *Vapours* work powerfully upon the *Spirits*, it is manifest; by sleep, by drunkenesse, by melancholy passions, by laticant Medicines, by Odours calling the *Spirits* back again, in swoonings and faintings.

The *Spirits* are condensed foure wayes; either by putting them to flight, or by refrigerating and cooling them; or by stroaking them, or by quieting them. And first of their *Condensation*, by putting them to *Flight*.

Whatsoever putteth to flight on all parts, driveth the body into his Center, and so condenseth.

To the condensation of the *Spirits* by flight, the most powerfull and effectually, is *Opium*; and next, *Opiates*; and generally, all *Soporiferous things*.

The force of *Opium*, to the condensation of the *Spirits*, is exceeding strong; when as, perhaps, three grains thereof, will, in a short time, so coagulate the *Spirits*, that they return no more, but are extinguished, and become immoveable.

Opium, and the like, put not the *Spirits* to flight, by their coldnesse; For they have parts manifestly hot; but, on the contrary, coole, by their putting the *Spirits* to flight.

The *Flight* of the *Spirits*, by *Opium*, and *Opiate Medicines*, is best seen by applying the same outwardly; For the *Spirits* straight withdraw themselves, and will return no more; but the part is mortified, and turnes to a *Gangrene*.

Opiates, in grievous pains, as in the Stone, or the cutting off of a limb, mitigate pains, most of all, by putting the *Spirits* to flight.

Opiates obtain a good effect from a bad cause; For the *Flight* of the *Spirits* is evill; but the condensation of them, through their flight, is good.

The Grecians attributed much, both for health, and for prolongation of Life, to *Opiates*; but the *Arabians* much more. Infomuch that their *Grand Medicines* (which they called, the *Gods Hands*;) had *Opium* for their Basis, and principall Ingredient; other things being mixed, to abate and correct the noxious qualities thereof: Such were *Treacle*, *Mithridate*, and the rest.

20

Whatsoever is given with good successe, in the curing of *Pestilentiall* and *Malignant Diseases*; to stop and bridle the *Spirits*, lest they grow turbulent and tumultuate, may very happily be transferred to prolongation of life: For one thing is effectually unto both; namely, the *condensation* of the *Spirits*: Now there is nothing better for that, than *Opiates*.

21

The *Turkes* finde *Opium*, even in a reasonable good quantity, harmlesse and comfortable; infomuch, that they take it before their battell, to excite Courage; But to us, unlesse it be in a very small quantity, and with good Correctives, it is Mortall.

22

Opium and *Opiates*, are manifestly found to excite *Venus*; which shewes them to have force to corroborate the *Spirits*.

23

Distilled water of wilde Poppy, is given with good successe, in *Surfets*, *Agues*, and divers diseases; which, no doubt, is a temperate kinde of *Opiate*: Neither let any man wonder at the various use of it; for that is familiar to *Opiates*; in regard that the *Spirits*, corroborated and condensed, will rise up against any disease.

24

The *Turkes* use a kinde of Herb, which they call *Caphe*; which they dry and powder; and then drink it in warm water; which they say, doth not a little sharpen them, both in their Courage, and in their Wits; notwithstanding, if it be taken in a large quantity, it affects, and disturbs the minde; whereby it is manifest, that it is of the same nature with *Opiates*.

25

There is a root much renowned in all the *Eastern parts*, which they call *Betel*; which the *Indians*, and others, use to carry in their mouthes, and to champ it: and by that champing, they are wonderfully enabled, both to endure labours, and to overcome sicknesses, and to the act of carnall copulation: It seems to be a kinde of *Stupefactive*, because it exceedingly blackes the teeth.

26

Tobacco, in our Age, is immoderately grown into use; and it affects men with a secret kind of delight; infomuch that they who have once inured themselves unto it, can hardly afterwards leave it: And, no doubt, it hath power to lighten the body, and to shake off wearinesse: Now the vertue of it is commonly thought to be, because it opens the passages, and voids humours: But it may more rightly be referred to the *condensation* of the *Spirits*; for it is a kinde of *Henbane*, and manifestly troubles the Head, as *Opiates* doe.

27

There are sometimes *Humours* engendred in the Body, which are, as it were, *Opiate* themselves; as it is in some kinde of *Melancholies*: with which, if a man be affected, it is a signe of very long life.

28

The *Simple Opiates*, (which are also called *Stupefactives*) are these; *Opium* it selfe, which is the juyce of *Poppy*, both the *Poppies*, as well in the Herb, as in the Seed; *Henbane*, *Mandrake*, *Hemlock*, *Tobacco*, *Nightshade*.

29

The compound *Opiates* are, *Treacle*, *Mithridate*, *Trifera*, *Ladanum Paracelsi*, *Diacodium*, *Diafscordium*, *Philonium*, *Pils of Hounds-tongue*.

30

From this which hath been said, certain Designations, or Councils may be deduced, for the prolongation of Life, according to the present intention; namely, of *condensing* the *Spirits* by *Opiates*.

31

Let there be therefore, every year, from Adult years of youth, an *Opiate* diet; let it be taken about the end of *May*; because the *Spirits* in the Summer, are more loose, and attenuated; and there is lesse danger from cold humours; Let it be some *Magistral Opiate*, weaker than those that are commonly in use, both in respect of a smaller quantity of *Opium*, and of a more sparing mixture of extream hot things; Let it be taken in the morning, betwixt sleeps. The fare for that time would be more simple, and sparing than ordinary, without Wine, or Spices, or vaporous things: This Medicine to be taken onely each other day, and to be continued for a Fortnight: this Designation in our judgement, comes home to the intention.

32

Opiates also may be taken, not onely by the mouth, but also by *Fumes*; But the *Fumes* must be such, as may not move the expulsive Faculty too strongly, nor force down humours; But onely taken in a *West*, may work upon the *Spirits* within the brain:

33

brain : And therefor a *Suffumigation* of *Tobacco*, *Lignum Aloes*, *Rosemary-leaves* dried, and a little *Myrrhe*, snuffed up in the morning, at the Mouth and Nostrils, would be very good.

34 In *Grand Opiates*, such as are *Treacle*, *Mithridate*, and the rest ; it would not be amiss (especially in youth) to take rather the *distilled Waters* of them, than themselves, in their Bodies : For the vapour, in distilling, doth rise ; but the heat of the Medicine commonly setteth. Now *distilled Waters* are good in those vertues, which are conveyed by Vapours ; in other things but weak.

35 There are Medicines, which have a certain weak and hidden degree. And therefore safe ; To an *Opiate* Vertue : These send forth a slow and copious vapour, but not Malignant, as *Opiates* doe : therefore they put not the Spirits to Flight ; Notwithstanding they congregate them, and somewhat thicken them.

36 Medicines in order to *Opiates*, are ; Principally *Saffron* ; next *Folium Indum*, *Amber-Grise*, *Coriander-seed* prepared, *Anomum*, *Pseuda-momum*, *Lignum Rhodium*, *Orange-Flower Water* ; and much more the *Infusion* of the same *Flowers* new gathered, in oyle of *Almonds* ; *Nutmegs* pricked full of holes, and macerated in *Rose-water*.

37 As *Opiates* are to be taken very sparingly, and at certain times, as was said ; so these secundaries may be taken familiarly, and in our daily diet ; and they will be very effectually to prolongation of life. Certainly, an *Apothecary* of *Calecute*, by the use of *Amber*, is said to have lived an hundred and sixty yeares ; And the noble men of *Barbary*, through the use thereof, are certified to be very long liv'd ; whereas the meane people are but of short life. And our *Ancestors*, who were longer liv'd than we, did use *Saffron* much in their *Cakes*, *Broths*, and the like. And touching the first way of condensing the Spirits by *Opiates*, and the *Subordinates* thereto, thus much.

38 Now we will enquire of the second way of condensing the Spirits by *Cold*. For the proper work of *Cold* is *Condensation* ; and it is done without any malignity, or adverse quality ; And therefor it is a safer operation than by *Opiates*, though somewhat lesse powerfull, if it be done by turns onely, as *Opiates* are. But then again, because it may be used familiarly, and in our daily diet with moderation ; it is much more powerfull for the prolongation of Life, than by *Opiates*.

39 The *Refrigeration* of the Spirits is effected three wayes ; Either by *Respiration* ; or by *Vapours* ; or by *Aliment*. The first is the best ; but, in a sort, out of our power : the second is potent, but yet ready, and at hand ; the third is weak, and somewhat about.

40 *Aire cleare* and pure ; and which hath no fogginess in it, before it be received into the Lungs ; and which is least exposed to the Sun-beames, condenseth the Spirits best. Such is found either on the tops of dry Mountaines, or in *Champagnes*, open to the winde, and yet not without some shade.

41 As for the *Refrigeration* and *Condensation* of the Spirits by *Vapours* ; the Root of this operation we place in *Nitre* ; as a creature purposely made and chosen for this end, being thereunto lead and perswaded by these Arguments.

42 *Nitre* is a kinde of coole Spice : This is apparent to the sense it self ; For it bites the Tongue, and Palate, with *Cold*, as Spices doe with *Heat* : And it is the onely thing, as far as we know, that hath this property.

43 Almost all cold things, (which are cold properly, and not by accident, as *Opium* is) are poore, and jejune, of Spirit ; Contrarily, things full of Spirit, are almost all hot : only *Nitre* is found amongst Vegetables, which aboundeth with Spirit, and yet is cold. As for *Campfire*, which is full of spirit, and yet performeth the actions of cold, it cooleth by accident onely ; as namely, for that by the thinness thereof, without Acrimony, it helpeth perspiration in inflammations.

44 In congealing and freezing of *Liquors* ; (which is lately grown into use ;) by laying Snow and Ice on the outside of the vessell ; *Nitre* is also added ; and no doubt it exciteth and fortifieth the congelation. It is true, that they use also for this work, ordinary Bay-Salt ; which doth rather give activity to the coldness of the Snow, than coole by it selfe : But, as I have heard, in the hotter Regions, where Snow falls not, the congealing is wrought by *Nitre* alone ; but this I cannot certainly affirme.

45 It is affirmed, that *Gun-powder*, which consisteth principally of *Nitre*, being taken in drink, doth conduce to valour ; and that it is used oftentimes, by *Mariners* and *Souldiers*, before they begin their battels, as the *Turkes* doe *Opium*.

Nitre is given with good successe, in burning Agues, and pestilentiall Fevers, to mitigate and bridle their pernicious Heats.

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It is manifest, that Nitre in Gunpowder doth mightily abhorre Flame, from whence is caused that horrible Crack and puffing.

47

Nitre is found to be, as it were, the Spirit of the Earth: For this is most certain, That any Earth, though pure and unmixed with Nitrous matter, if it be so laid up, and covered, that it be free from the Sun-beames, and putteth forth no Vegetable, will gather Nitre, even in good abundance. By which it is clear, that the Spirit of Nitre is not onely inferiour to the Spirit of living Creatures, but also to the Spirit of Vegetables.

48

Cattell, which drink of Nitrous water, doe manifestly grow fat; which is a signe of the cold in Nitre.

49

The manuring of the soile, is chiefly by Nitrous substances; for all dung is Nitrous, and this is a signe of the Spirit in Nitre.

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From hence it appeares, that the Spirits of Man, may be cooled and condensed by the Spirit of Nitre; and be made more Crude, and lesse eager. And therefore, as strong Wines, and Spices, and the like, doe burn the Spirits, and shorten life: So on the contrary side, Nitre doth compose and repress them, and furthereth to life.

51

Nitre may be used in meat, mixed with our Salt, to the tenth part of the Salt; In in broths, taken in the morning, from three graines to ten; also in Beere: but howsoever it be used, with moderation, it is of prime force to long life.

52

As Opium holds the preheminance in condensing the Spirits, by putting them to Flight; and hath withall his Subordinates, lesse potent, but more safe, which may be taken both in greater quantity, and in more frequent use; of which we have formerly spoken: So also Nitre which condenseth the Spirits by cold, and by a kinde of Fref-cour, (as we now-a dayes speak) hath also his Subordinates.

53

Subordinates to Nitre are, All those things which yeeld an Odour, somewhat Earthy; like the smell of Earth, pure and good, newly digged or turned up: Of this sort the chiefe are; Borage, Buglosse, Langue de Bœuf, Burnet, Strawberry leaves, and Strawberies, Frambois, or Raspis, Raw Cucumbers, Raw Pearmaines, Vine-leaves, and Buds; also Violets.

54

The next in order, are those which have a certain freshnesse of smell, but somewhat more inclined to Heat; yet not altogether void of that vertue of Refreshing, by coolnesse: such as are, Balme, Green Citrons, Green Oranges, Rose-water distilled, Roasted Wardens; also the Damask, Red, and Musk Roses.

55

This is to be noted, That Subordinates to Nitre, doe commonly conferre more to this Intention, Raw, than having passed the fire; because that Spirit of Cooling is dissipated by the Fire: Therefore they are best taken, either infused in some liquor, or Raw.

56

As the the condensation of the Spirits by subordinates to Opium, is, in some sort, performed by Odours: So also that, which is by subordinates to Nitre: Therefore the smell of new and pure Earth, taken either by following the Plough, or by digging, or by weeding, excellently refresheth the Spirits. Also the leaves of trees in Woods, or Hedges, falling towards the middle of Autumn, yeeld a good refreshing to the Spirits; but none so good as Strawberry Leaves dying. Likewise the smell of Violets, or Wall-Flowers, or Bean-Flowers, or Sweet-Briar, or Hony-suckles, taken, as they grow, in passing by them onely, is of the same nature.

57

Nay, and we know a certain great Lord, who lived long, that had every Morning, immediatly after sleep, a Clod of fresh Earth, laid in a faire Napkin, under his Nose, that he might take the smell thereof.

58

There is no doubt, but the cooling and tempering of the blood by coole things, such as are, Endive, Succoury, Liver-wort, Purslaine, and the like, doe also by consequent, coole the Spirits: But this about; whereas vapours coole immediatly.

59

And as touching the condensing of the Spirits by Cold, thus much: The third way, of condensing the Spirits, we said to be, by that which we call stroaking the Spirits: The fourth, by quieting the Alacrity and Unrulinesse of them.

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Such things stroake the Spirits, as are pleasing and friendly to them, yet they allure them not to goe abroad; but rather prevaile, that the Spirits contented as it were,

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in their own society, do enjoy themselves; and betake themselves into their proper Center.

61 For these, if you recollect those things which were formerly set down, as *Subordinates* to *Opium* and *Nitre*, there will need no other *Inquisition*.

62 As for the quieting of the *unrulinesse* of the Spirits, we shall presently speak of that, when we enquire touching their *Motion*. Now then, seeing we have spoken of that *condensation* of the Spirits, which pertaineth to their substance, we will come to the *Temper* of *Heat* in them.

63 The *Heat* of the Spirits, as we said, ought to be of that kinde, that it may be *robust*, not *eager*; and may delight rather to master the tough and obstinate, than to carry away the thin and light Humours.

64 We must beware of *Spices*, *Wine*, and strong *Drinks*; that our use of them be very temperate, and sometimes discontinued: Also of *Savory*, *Wild-marjoram*, *Peny-royall*, and all such as bite and heat the tongue. For they yeeld unto the Spirits an *Heat*, not *Operative*, but *Predatory*.

65 These yeeld a *Robust* heat, especially *Elecampane*, *Garlick*, *Carduus Benedictus*, *Water-eresses*, while they are young, *Germander*, *Angelica*, *Zedoary*, *Vervin*, *Valerian*, *Myrrhe*, *Pepper-wort*, *Elder-Flowers*, *Carden-Chervile*; The use of these things with choyce, and judgement, sometimes in *Sallets*, sometimes in *Medicines*, will satisfie this *Operation*.

66 It falls out well, that the *Grand Opiates* will also serve excellently for this *Operation*; in respect that they yeeld such an *Heat* by composition, which is wished, but not to be found in *Simples*. For the mixing of those excessive hot things, (such as are *Euphorbium*, *Pellitory of Spain*, *Stavis-acre*, *Dragon-wort*, *Anacordi*, *Castoreum*, *Aristolochium*, *Opoponax*, *Ammoniacum*, *Galbanum*, and the like; which of themselves cannot be taken inwardly,) To qualifie and abate the *Stupefactive* vertue of the *Opium*; They doe make such a constitution of a Medicament, as we now require, which is excellently seen in in this; That *Treacle*, and *Mithridate*, and the rest, are not sharp, nor bite the tongue, but are onely somewhat bitter, and of strong sent; and at last manifest their heat, when they come into the stomach, and in their subsequent operations.

67 There conduce also, to the *Robust Heat* of the Spirits, *Venus* often excited, rarely performed: And, no lesse, some of the affections, of which shall be spoken hereafter. So touching the heat of the Spirits, Analogicall to the prolongation of *Life*, thus much.

68 Touching the *Quantity* of the Spirits, that they be not *exuberant*, and *boyling*; but rather *sparing*, and within a mean, (seeing a small flame doth not devoure so much, as a great flame,) the *Inquisition* will be short.

69 It seemes to be approved by experience; That a *spare Diet*, and almost a *Pythagoricall*; such as is either prescribed by the strict Rules of a *Monasticall life*, or practised by *Hermites*, which have *Necessity* and *Poverty* for their Rule; rendreth a man long-liv'd.

70 Hitherto appertain, *Drinking of water*, *A hard Bed*, *Abstinence from Fire*, *A slender Diet*; (as namely, of *Herbs*, *Fruits*, *Flesh*, and *Fish*, rather powdered, and salted, than fresh, and hot; *An haire Shirt*, frequent *Fastings*, frequent watchings, few sensuall pleasures, and such like: For all these diminish the Spirits, and reduce them to such a quantity, as may be sufficient onely for the Functions of *Life*; whereby the Depredation is the lesse.

71 But if the *Diet* shall not be altogether so *Rigorous*, and *Mortifying*; yet notwithstanding shall be alwayes equall and constant to it selfe, it worketh the same effect. We see it in *Flames*, that a *Flame* somewhat bigger, (so it be alwayes alike, and quiet) consumeth lesse of the *Fuell*, than a lesser *Flame* blown with *Bellows*; and by *Gusts* stronger, or weaker: That which the *Regiment* and *Diet* of *Cornarus* the *Venetian* shewed plainly; who did eat and drink so many yeares together, by a just weight, whereby hee exceeded an hundred yeares of Age, strong in Limbes, and entire in his senses.

72 Care also must be taken, that a body plentifully nourished, and not emaciated by any of these aforesaid Diets, omitteth not a seasonable use of *Venus*; lest the Spirits increase too fast, and soften, and destroy the body. So then touching a moderate quantity of *Spirits*, and (as we may say) *Frugall*, thus much.

73 The *Inquisition*, touching *Bridling* the *Motion* of the Spirits, followeth next. For

Motion, doth manifestly Attenuate, and Inflame them. This Brideling is done, by three meanes: by *Sleepe*; by *Avoiding of vehement Labours*, *Immoderate Exercise*, and, in a word, all *Lassitude* and by refraining *Irkſome Affections*. And first, touching *Sleepe*.

The Fable tells us, that *Epimenides* slept many yeares together, in a Cave; and all that time needed no Meat; because the *Spirits* waste not much in *ſleepe*.

Experience teacheth us, that certaine Creatures, as *Dormice*, and *Bats*, *ſleepe*, in ſome cloſe places, an whole winter together; Such is the force of *Sleepe*, to reſtraine all vitall Conſumption. That which *Bees*, and *Drones*, are alſo thought to doe; though ſometimes deſtitute of Honie: and likewiſe *Butterflies*, and other *Flies*.

Sleepe after *Dinner* (the ſtomack ſending up no unpleaſing Vapours to the Head, as being the firſt Dewes of our Meat,) is good for the *Spirits*, but derogatorie and hurtfull, to all other points of Health. Notwithſtanding in extreme Old age, there is the ſame Reason, of Meat, and *Sleepe*; For both, our Meales, and our *Sleepes* ſhould be then frequent, but ſhort, and little: Nay, and towards the laſt Period of old age, a meere *Reſt*, and, as it were, a perpetuall *Repoſing*, doth beſt; Eſpecially in winter time.

But as Moderate *Sleepe*, conferreth to long life; ſo much more, if it be *Quiet*, and not *Diſturbed*.

Theſe procure *Quiet Sleepe*, *Violets*, *Lettuce*, eſpecially boiled; *Syrup* of *Dried Roſes*; *Saffron*; *Balme*: *Apples*, at our going to bed; A *Sop* of *Bread* in *Malmesey*, eſpecially wherein *Musk Roſes* have beene firſt *infuſed*; therefore, it would not be amiſſe, to make ſome *Pill*, or a ſmall *Draught*, of theſe things, and to uſe it Familiarly. Alſo thoſe Things, which ſhut the Mouth of the Stomacke cloſe; As *Croiander ſeed* prepared; *Quinces*, and *Wardens*, roasted; doe induce ſound ſleepe: but above all things, in youth, and for thoſe that have ſufficient ſtrong Stomackes, it will bee beſt, to take a good *Draught* of *Cleare*, *Cold Water*, when they goe to bed.

Touching voluntarie and procured Traunces; As alſo *Fixed*, and *Profound* thoughts, ſo as they be without *Irkſomeneſſe*; I have nothing certaine: No doubt, they make to this Intention; And condense the *Spirits*, And that more potently, than *Sleepe*; Seeing, they lay aſleepe, and ſuſpend the ſenſes, as much, or more. *Touching them*, let further *Inquiry* be made. So farre touching *Sleepe*.

As for *Motion*, and *Exerciſes*; *Lassitude* hurteth; And ſo doth all *Motion*, and *Exerciſe*, which is too *Nimble*, and *Swift*; as running; *Tennis*, *Fencing*, and the like: And againe, when our ſtrength is extended, and ſtrained, to the uttermoſt; as *Dancing*, *Wreſtling*, and ſuch like: For it is certaine, that the *Spirits*, being driven into ſtreights, either by the ſwiftheſſe of the *Motion*, or by the ſtreining of the forces, Doe afterward become more *Eager*, and *Predatorie*. On the other ſide, *Exerciſes*, which ſtirre up a good ſtrong *Motion*; but not over ſwift, or to our utmoſt ſtrength, (ſuch as are *Leaping*, *Shooting*, *Riding*, *Bowling*, and the like) doe noe hurt, but rather benefit.

We muſt come now to the *Affections*, and *Paſſions* of the *Minde*, and ſee, which of them are Hurtfull to long life, which profitable.

Great joyes attenuate and diſſuſe the *Spirits*, and life: ſhorten *Familiar Cheerfullneſſe* ſtrengthens the *Spirits*, by calling them forth, and yet not reſolving them.

Impreſſions of joy in the ſenſe, are naught; ruminations of joy in the *Memory*; Or *Apprehenſions* of them, in *Hope*, or *Fancie*, are good.

Joy ſuppreſſed, or communicated ſparingly, doth more comfort the *Spirits* than joy powred forth and publiſhed.

Griefe and *ſadneſſe*, if it be void of *Feare*, and afflict not too much, doth rather prolong life; For it contracteth the *Spirits*, and is a kind of *Condensation*.

Great Feares ſhorten the Life; For though *Griefe* and *Feare* doe both ſtreighten the *Spirit*, yet in *Griefe* there is a ſimpe *Contraction*; but in *Feare*, by Reason of the Cares taken for the *Remedy*, and *Hopes* intermixed, there is a *turmoile* and *Vexing* of the *Spirits*.

Anger ſuppreſſed, is alſo a kinde of *Vexation*, and cauſeth the *Spirit* to feed upon the *Juyces* of the body, but let looſe, and breaking forth, it helpeth; As thoſe *Medicines* doe, which induce a *Robuſt Heat*.

Envie is the worſt of all *Paſſions*; And feedeth upon the *Spirits*; and they againe upon the *Body*, and ſo much the more, becauſe it is perpetuall, and as is ſaid *Keepeth no Holydayes*.

Pity of another Mans Miſfortune, which is not likely to befall our ſelves, is good

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But *Pity*, which may reflect, with some similitude, upon the party pitying, is naught, because it exciteth *Fear*.

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Light Shame hurteth not, seeing it contracteth the *Spirits* a little, and then straight diffuseth them; In so much that *Shamefast* Persons commonly, live long: but *Shame*, for some great *Ignominie*, and which afflicteth the *Minde* long, contracteth the *Spirits*, even to suffocation; and is *Pernicious*.

89

Love, if it be not unfortunate, and too deeply wounding, is a kinde of *Ioy*; And is subject to the same *Lawes*, which wee have set downe touching *Ioy*.

90

Hope is the most Beneficiall of all the *Affections*; And doth much to the Prolongation of *Life*, if it be not too often Frustrated; but entertaineth the *Fancie*, with an Expectation of good: Therefore they which fix, and propound to themselves, some End, as the Marke and Scope of their *Life*; And continually, and by Degrees, goe forward in the same; Live, for the most part long *Liv'd*: In so much, that when they are come to the top of their hope; And can goe no higher therein; They commonly droope, and Live not long after: So that hope is as a *Leafe-Ioy*; Which may be beaten out, to a great Extention, like *Gold*.

91

Admiration, and *Light contemplation*, are very powerfull, to the prolonging of life; For they hold the *Spirits*, in such things as Delight them; and suffer them not to tumultuate, or to carry themselves unquietly, and waywardly. And therefore, all the *Contemplatours* of *Naturall Things*, which had so many, and so eminent Objects to admire; (as *Democritus*, *Plato*, *Parmenides*, *Apollonius*,) were long *liv'd*: Also *Rhetoricians*, which tasted but lightly of things; and studied rather Exornation of speech, than profundity of Matters, were also long *liv'd*: As *Gorgias*, *Protagoras*, *Isocrates*, *Seneca*: And certainly, as old Men are, for the most part, Talkative; So Talkative Men, doe often grow very old: For it shewes a *Light Contemplation*; And such as doth not much straine the *Spirits*, or vex them, But Subtill, and Acute, and Eager Inquisition, shortens life; for it trieth the *Spirit*, and wasteth it.

And as touching the Motion of the *Spirits*, by the *Affections* of the *Minde*, thus much. Now we will adde certaine other Generall Observations, touching the *Spirits* beside the former; Which fall not into the Precedent Distribution.

92

Especiall Care must be taken, that the *Spirits* bee not too often Resolved; For attenuation goeth before Resolution; And the *Spirit* once attenuated, doth not very easily retire, or is Condensed: Now Resolution is caused, by Over-great Labours; Over-vehement affections of the *Mind*; Over-great Sweats; Over-great Evacuations; Hot-baths, and an untemperate, and unseasonable use of *Venus*: Also by Over-great Cares, and Carplings, and Anxious Expectations: Lastly, by Malignant Diseases, and Intolerable Paines and Torments of the body; All which, as much as may bee, (which our *Vulgar Physicians* also advise,) must be avoyded.

93

The *Spirits* are delighted, both with *Wonted Things*, and with *New*: Now it maketh wonderfully to the conversation of the *Spirits*, in Vigour; That wee neither use *Wonted Things*, to a Satiety, and Glutting; Nor *New Things*, before a quick, and strong Appetite: And therefore, both *Customes* are to be broken off, with Judgment, and Care, before they breed a fullnesse; And the *Appetite*, after new Things, to be restrained for a time, untill it grow more sharpe and jocund: And moreover, the *Life*, as much as may be, so to be ordered; That it may have many Renovations; and the *Spirits*, by perpetuall Conversing in the same Actions, may not wax Dull, for though it were no ill saying of *Seneca's*; *The fool doth ever begin to live*; Yet this Folly, and many more such, are good for long *Life*.

94

It is to be observed, touching the *Spirits*; (though the Contrary useth to be done;) That when Men perceive their *Spirits*, to be in a good, placide, and Healthful State; (That which will be seene, by the Tranquillitie of their *Minde*, and cheerefull disposition;) That they cherish them, and not change them: but when, in a Turbulent, & untoward State; (Which will also appeare by their Sadnesse, Lumpishnesse, and other Indisposition of their *Minde*;) that then they straight overwhelm them and alter them. Now the *Spirits* are contained in the same state, by a Restraining of the *Affections*; temperatenes of Diet; Abstinence from *Venus*, Moderation in Labour; Indifferent Rest and Repose; And the Contrary to these, do alter and overwhelm the *Spirits*; As namely, Vehement *Affections*; Profuse Feastings; Immoderate *Venus*; Difficult labours; Earnest studies, and prosecutions of businesse. Yet Men are wont when they are Merriest, and best disposed, then to apply themselves to Feastings,

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Venus, Labours, Endeavours, Businesse; whereas, if they have a regard to long Life (which may seeme strange,) they should rather Practise the Contrary. For wee ought to cherish and preserve good *Spirits*; And for the evill disposed *Spirits*, to discharge and alter them.

Ficinus saith not unwisely; That *Old Men*, for the comforting of their *Spirits*, ought often to remember, and ruminare upon the *Acts* of their *Childhood* and *Youth*. Certainly, such a Remembrance, is a kinde of Peculiar Recreation, to every *Old Man*: And therefore it is a Delight to Men, to enjoy the Societie of them, which have beene brought up together with them; And to visit the Places of their Education. *Vespasian* did attribute so much to this Matter; That when hee was Emperour, hee would, by no meanes, bee perswaded to leave his Fathers house, though but meane; Lest he should lose the wonted Object of his Eyes, and the Memory of his child-hood: And besides, he would drinke, in a *Woodden cup*, tipped with silver, which was his *Grandmothers*, upon *Festivall Dayes*.

One Thing, above all, is gratefull to the *Spirits*; that there be a *Continuall Progress*, to the more *Benigne*. Therefore, wee should lead, such a Youth, and Manhood, that our Old Age should find new Solaces; Whereof the chiefe is *Moderate Ease*. And therefore, Old men, in Honourable Places, lay violent hands upon themselves, who retire not to their Ease: whereof may be found an Eminent Example in *Cassiodorus*; who was of that Reputation amongst the *Gothish Kings* of *Italy*, that he was as the Soul of their Affaires: Afterwards, being neare Eighty yeares of age, he betooke himselfe to a Monastery; Where he ended not his Dayes, before he was an Hundred yeares old. But this thing doth require two Cautions; One, that they drive not off, till their Bodies be utterly worne out, and Diseased; For in such Bodies, all Mutation, though to the more *Benigne*, hasteneth Death: The other, that they surrender not themselves to a *Sluggish Ease*; But that they Embrace something, which may entertain thier thoughts, and Minde, with Contentation: In which kinde, the chiefe Delights, are Reading and Contemplation; And then, the Desires of Building, and Planting.

Lastly, the same *Action*, *Endeavour*, and *Labour* undertaken cheerefully, and with a good will, doth refresh the *Spirits*; But with an *Aversation* and *Vnwillingnesse*, doth Fret and Deject them. And therefore, it conferreth to long life; Either that a Man hath the Art, to institute his life so, as it may be Free, and Sutable to his owne Humour; Or else to lay such a Command upon his minde, that whatsoever is imposed by Fortune, it may rather lead him, than drag him.

Neither is that to be omitted, towards the Government of the *Affections*, That especiall care be taken, of the *Mouth* of the *Stomach*; Especially, that it be not too much relaxed; For that part hath a greater Dominion over the *Affections*; Especially the Daily *Affections*; Than either the Heart, or Braine: Only those things excepted, which are wrought by potent Vapours; as in Drunkenesse, and Melancholy.

Touching the *Operation* upon the *Spirits*, that they may remaine *Youthfull*, and Renew their *Vigour*, thus much; Which wee have done the more accurately, for that there is, for the most part, amongst *Physicians*, and other Authors, touching these *Operations*, a deepe silence: but especially, because the *Operation* upon the *Spirits*, and their *Waxing greene againe*, is the most Ready, and Compendious way, to long life: And that, for a two-fold Compendiousnesse; one, because the *Spirits* work compendiously, upon the body; the other, because *Vapours*, and the *Affections*, worke compendiously upon the *Spirits*: So as these attaine the end, as it were, in a right line; Other Things, rather in lines Circular.



The Operation upon the Exclusion of the Aire 2.

The History.

He *Exclusion* of the *Aire*, *Ambient*, tendeth to Length of Life, two waies; First, for that the *External Aire*, next unto the *Native Spirit*, (howsoever the *Aire* may bee said to animate the *Spirit* of man; and conferreth not a little to health;) doth most of all prey upon the *Juyces* of the body;

And hasten the Desiccation thereof; And therefore, the Exclusion of it, is effectual to Length of Life.

Another effect, which followeth the Exclusion of Aire, is much more subtile and profound; Namely, that the Body closed up, and not perspiring by the Pores, detaineth the Spirit within, and turneth it upon the Harder parts of the Body; Whereby the Spirit Mollifies, and Intenerates them.

Of this Thing, the Reason is explained in the Desiccation of Inanimate Bodies; And it is an Axiome almost infallible; That the Spirit Discharged, and Issuing forth, dryeth Bodies, Detained, melteth, and intenerateth them: And it is further to be assumed; That all Heat doth properly Attenuate and moisten; And Contracteth, and Drieth only by Accident.

Leading the Life in Dens and Caves, where the Aire receives not the Sun-beams, may be effectually to Long Life. For the Aire, of it selfe, doth not much towards the Depredation of the Body, unlesse it be stirred up by Heat. Certainly, if a Man shall recall Things past to his Memory, it will appeare, that the Statures of Men, have beene anciently much greater, than those that succeeded; As in Sicily, and some other Places. But this kind of Men led their Lives, for the most part, in Caves. Now Length of Life, and largesse of Limbs, have some Affinity. The Cave also of Epimenides, walkes amongst the Fables. I suppose likewise, that the Life of Columnar Anchorites, was a thing Resembling the Life in Caves; In respect, the Sun-beams could not much pierce thither; Nor the Aire receive any great changes, or Inequalities. This is certaine; both the Simeon Stylita's as well Daniell, as Saba; And other Columnar Anchorites, have been exceedingly long liv'd. Likewise, the Anchorites in our dayes, closed up and immured, either within Walls, or Pillars, are often found to be long Liv'd.

Next unto the life in Caves, is the life on Mountaines: For as the Beames of the Sun, doe not penetrate into Caves; so on the Tops of Mountaines, being destitute of Reflexion, they are of small force. But this is to be understood of Mountaines, where the Aire is cleare, and pure; Namely, whether, by reason of the Driness of the Valleyes, Clouds, and Vapours, doe not ascend: As it is in the Mountaines, which encompasse Barbary; Where, even at this day, they live many times, to an Hundred and fifty yeares; As hath been noted before.

And this kinde of Aire; Of Caves, and Mountaines, of his owne proper Nature, is little or nothing Predatory: But Aire, such as ours is, which is Predatory through the heat of the sunne, ought, as much as is possible, to be excluded from the Body.

But the Aire, is prohibited, and excluded two waies; first by Closing the Pores; secondly, by Filling them up.

To the Closing of the Pores, Help; Coldnesse of the Aire; Going naked, whereby the Skin is made Hard; Washing in Cold Water; Astringents applyed to the skin; Such as are Mastick, Myrrhe, Myrtle.

But much more may we satisfie this Operation, by Baths; yet those rarely used, (especially in summer;) which are made of Astringent Minerall waters, such as may safely be used; As Waters participating of Steele and Copperas; For these do potently contract the Skinne.

As for Filling up the Pores, Paintings, and such like Vinctuous Dawbings; And, (which may most commodiously be used) Oyle, and Fat Things; Do no lesse conserve the substance of the body, than Oile colours and Vernish doe preserve Wood.

The Ancient Brittons painted their Bodies with Woad, and were exceeding long Liv'd: the Piets also used Paintings; And are thought, by some to have derived their Name from thence.

The Brasilians, and Virginians Paint themselves, at this day; Who are, (especially the former,) very long Liv'd. In so much, that five yeares ago, the French Jesuits had speech with some, who remembred the Building of Fernamburgh; which was done an hundred and twenty yeare since: And they were then at Mans estate.

Ioannes de Temporibus, who is reported to have extended his life to three hundred yeares; being asked, How he preserved himselfe so long; Is said to have answered by Oyle without, and by Honey within.

The Irish, especially the Wild-Irish, even at this day, live very long. Certainly, they report, that within these few yeares, the Countesse of Desmond lived to an hundred and forty yeares of Age, and bred teeth three times. Now the Irish have a fashion, to chafe, and, as it were, to baste themselves with old Salt-butter, against the Fire.

The same *Irish* use to weare *Saffroned* Linnen, and Shirts, which though it were at first devised to prevent vermine, yet howsoever, I take it, to be very usefull for lengthning of life: For *Saffron* of all things that I know, is the best thing for the skin, and the comforting of the flesh; seeing it is both notably Astringent; and hath besides, an Oleosity, and subtile heat, without any Acrimony. I remember a certaine *Englishman*, who when he went to Sea, carried a bagge of *Saffron* next his Stomach, that hee might conceale it, and so escape Custome: And whereas he was wont to bee alwayes exceeding Sea-sick; at that time he continued very well, and felt no provocation to vomit.

Hippocrates adviseth, in Winter to weare clean Linnen; and in Summer, foule Linnen, and besmeared with Oyle: The Reason may seeme to be, because in Summer the *Spirits* exhale most; Therefore the pores of the skin would be filled up.

Hereupon we are of opinion, that the use of Oyle, either of *Olives*, or sweet *Almonds*, to anoint the skin therewith, would principally conduce to long life: The anointing would be done every morning when we rise out of Bed, with oyle, in which a little Bay-salt and *Saffron* is mixed. But this Anointing must be lightly done, with Wooll, or some soft Sponge; not laying it on thick, but gently touching, and wetting the skin.

It is certain, that *Liquours*, even the Oyle themselves, in great quantities draw somewhat from the body; but contrarily, in small quantities, are drunke in by the body; Therefore the anoynting would be but light, as we said; or rather the thirst it selfe, would be besmeared with oyle.

It may haply be objected, that this anointing with oyle, which wee commend, (Though it were never in use with us; and amongst the *Italians* is cast off againe) was anciently very familiar amongst the *Grecians* and *Romans*, and a part of their Diet; and yet men were not longer liv'd in those dayes than now. But it may rightly be answered, Oyle was in use onely after Bathes, unlesse it were, perhaps, amongst *Champions*: Now hot Bathes, are as much contrary to our operation, as Anointings are congruous; seeing the one opens the passages, the other stops them up. Therefore the Bath, without the anointing following, is utterly bad; the anointing without the Bath, is best of all. Besides, the anointing amongst them, was used, onely for *Delicacie*: Or, (if you take it at the best) for *Health*: But by no meanes in order to long life: and therefore they used them with all pretious ointments, which were good for deliciounesse, but hurtfull to our Intention, in regard of their heat; so that *Virgil* seemeth not to have said amisse;

Nec Castia liquidi corrumpitur usus Olivi.

That odoriferous *Casia* bath not supplanted the use of neat Oyle-Olive.

Anointing with Oyle, conduceth to health, both in Winter, by the exclusion of the cold Aire; and in Summer, by detaining the spirits within, and prohibiting the Resolution of them; And keeping off the force of the Aire, which is then most predatory.

Seeing the anointing with Oyle, is one of the most potent operations to long life; wee have thought good to adde some Cautions, lest the health should bee endangered. They are four, according to the four *Inconveniences* which may follow thereupon.

The first *Inconvenience* is, that by repressing sweats, it may engender Diseases from those Excrementitious Humours. To this a remedy must be given by Purges and Clysters; that evacuation may be duly performed. This is certain, that evacuation by sweats, commonly advanceth health, and derogateth from long life: But gentle Purgers work upon the Humours, not upon the Spirits, as Sweat doth.

The second *Inconvenience* is; that it may heat the body, and in time inflame it: For the Spirits shut in, and not breathing forth, acquire heat. This inconvenience may be prevented, if the Diet most usually incline to the colder part; and that at times, some proper cooling Medicines be taken, of which we shall straight speak, in the operation upon the blood.

The third is, that it may annoy the head: For all Oppletion from without, strikes back the vapours, and sends them up unto the head. This inconvenience is remedied by Purgers, especially, Clysters; and by shutting the mouth of the Stomach strongly, with Stiptickes; and by combing and rubbing the head, and by washing it with convenient Lies, that something may exhale; and by not omitting competent and good exercises, that something also may perspire by the skin.

25

The fourth *Inconvenience*, is a more subtile Evill; namely, that the Spirit, being detained by the closing up of the *Pores*, is likely to multiply it selfe too much: For when little issueth forth, and new Spirit is continually ingendred, the Spirit increaseth too fast, and so preyeth upon the body more plentifully. But this is not altogether so; for all Spirit closed up, is dull; (For it is blown and excited with motion, as Flame is,) and therefore it is lesse active, and lesse generative of it selfe: Indeed it is thereby increased in Heat, (as Flame is) but slow in Motion: and therefore the remedy to this Inconvenience, must be by cold things; being sometimes mixed with *Oyle*; such as are *Roses* and *Mirtle*: For we must altogether disclaim hot things, as wee said of *Cassa*.

26

Neither will it be unprofitable, to weare next the Body, Garments that have in them, some *Unctuosity*, or *Oleosity*, not *Aquosity*; for they will exhaust the Body lesse: Such are those of Woollen, rather than those of Linnen. Certainly, it is manifest in the Spirits of Odours, That if you lay sweet powders amongst Linnen, they will much sooner lose their smell, than amongst Woollen. And therefore Linnen is to bee preferred for delicacie and neatnesse, but to bee suspected for our *Operation*.

27

The *Wilde Irish*, as soon as they fall sick, the first thing they doe, is to take the sheets off their beds, and to wrap themselves in the woollen cloathes.

28

Some report, that they have found great benefit in the conservation of their health, by wearing *Scarlet Wastcoats* next their skin, and under their shirts, as well down to the nether parts, as on the upper.

29

It is also to be observed, that *Aire*, accustomed to the body, doth lesse prey upon it, than new *Aire*, and often changed. And therefore poore people, in small Cottages, who live alwayes within the smell of the same chimney, and change not their seats, are commonly longest liv'd: notwithstanding, to other Operations, (especially for them whose Spirits are not altogether dull) wee judge change of aire to be very profitable. But a mean must be used, which may satisfie on both sides: This may bee done by removing our habitation foure times a yeare, at constant and set times, unto convenient seats; that so the body may neither be in too much peregrination, nor in too much station. And touching the *Operation*, upon the *Exclusion* of *Aire*, and avoiding the predatory force thereof, thus much.



The Operation upon the Blood, and the Sanguifying Heat. 3.

The History.

I



HE two following Operations, answer to the two precedent; and are in the Relation of *Passives* to *Actives*: For the two precedent intend this, That the *Spirits* and *Aire* in their actions may bee the lesse depredatory; and the two latter, that the *Blood* and *Juice* of the Body may bee the lesse depredable. But because the blood is an irrigation, or watering of the Juyces, and Members; and a preparation to them: therefore we will put the operation upon the *Blood* in the first place. Concerning this *Operation*, we will propound certain Counsels, few in number, but very powerfull in vertue. They are three.

2

First, there is no doubt, but that if the blood bee brought to a cold temper, it will bee so much the more dissipable. But because the cold things, which are taken by the mouth, agree but ill with many other Intentions; Therefore it will bee best to finde out some such things, as may bee free from these Inconveniences. They are two.

3

The first is this: Let there be brought into use, especially in youth, *Clysters*, not *Purging* at all, or *Absterging*, but onely cooling, and somewhat opening: Those are approved, which are made of the Juyces of *Lettuce*, *Purslane*, *Liver-wort*, *Housleeke*, and the *Mucilage* of the seed of *Flea-wort*, with some temperate opening decoction; And a little

little *Campfire* : but in the declining Age, let the *Houfleeke*, and *Purslaine* be left out: And the *Juyces* of *Borrage* and *Endive*, and the like, be put in their rooms : And let these *Clysters* be retained, if it may be, for an houre, or more.

The other is this, Let there be in use, especially in Summer, *Bathes* of fresh water, and but luke-warme, altogether without *Emollients*, as *Mallows*, *Mercury*, *Milke*, and the like; rather take new *whey* in some good quantity, and *Roses*.

But, (that which is the principall in this Intention, and New) we advise, that before the bathing, the body be anointed with oyle, with some *Thicknes*; whereby the quality of the cooling may be received, and the water excluded: yet let not the pores of the body be shut too close: For when the outward cold closeth up the body too strongly, it is so farre from furthering coolenesse, that it rather forbids it, and stirres up Heat.

Like unto this, is the use of *Bladders* with some decoctions and cooling juyces, applied to the inferior Region of the body; namely, from the ribs to the privy parts: for this also is a kinde of *bathing*, where the body of the liquor is for the most part excluded, and the cooling quality admitted.

The third Counsell remaineth, which belongeth not to the quality of the *blood*, but to the substance thereof, that it may be made more firm and lesse dissipable; and such, as the heat of the Spirit may have the lesse power over it.

And as for the use of *Filings* of gold, *Leafe-gold*, powder of *Pearle*, *Pretious stones*, *Corall*, and the like, we have no opinion of them at this day, unlesse it bee onely as they may satisfie this present Operation. Certainly, seeing the *Arabians*, *Grecians*, and *Moderne Physicians*, have attributed such vertues to these things; It cannot be altogether Nothing, which so great Men have observed of them. And therefore omitting all fantastical Opinions about them, we doe verily beleve, That if there could bee some such thing conveyehed into the whole Masse of the blood, in Minute and fine Portions; Over which the Spirits, and heat should have little, or no power; Absolutely, it would not onely resist *Putrefaction*, but *Arefaction* also; And be a most effectual Meanes, to the prolongation of life. Neverthelesse, in this thing, severall Cautions are to be given. First, that there be a most exact Comminution: Secondly, that such hard and solide Things, be void of all Malignant Qualitie; Left while they be dispersed, and lurk in the veines, they breed some Inconvenience: Thirdly, that they be never taken together with Meats, nor in any such mannner, as they may stick long; Left they beget dangerous obstructions, about the Mesentery: Lastly, that they be taken very rarely, that they may not congregate, and knot together, in the veines.

Therefore let the manner of taking them be *Fasting* in *White wine*; A little Oyle of *Almonds* mingled therewith; Exercise used immediately upon the taking of them.

The *Simples*, which may satisfie this Operation, are; In stead of all, *Gold*, *Pearles*, and *Corall*: For all *Mettalls* except *Gold*, are not without some Malignant Qualitie, in the Dissolutions of them; Neither will they be beaten, to that exquisite Finenesse, that *Leafe-Gold* hath: As for all *Glassie*, and *Transparent Jewells*, wee like them not, (as wee said before,) for feare of Corrosion.

But in our judgment, the safer, and more effectual way, would be, by the use of *Woods*, in Infusions, and Decoctions; For there is in them sufficient, to cause Firmnesse of *Bloud*; And not the like danger, for breeding Obstructions: But especially, because they may be taken in Meat, and Drink; whereby they will finde the more easie Entrance into the veines; And not be voided in Excrements.

The *Woods*, fit for this purpose, are; *Sanders*, the *Oake*, and *Vine*: As for all Hot *Woods*, or something *Rosennie*, wee reject them: Notwithstanding, you may adde the *Woody Stalks* of *Rose-marie* dried, For *Rose-Marie* is a Shrub, and exceedeth, in Age, many trees: Also, the *Woody Stalks* of *Ivie*, but in such quantity as they may not yeeld an unpleasing taste.

Let the *Woods* be taken, either boiled in broathes; Or infused in *Must*, or *Ale*, before they leave working, but in broathes, (as the custome is, for *Guaiacum*, and the like,) they would be infused a good while, before the boyling; That the firmer part of the *Wood*, and not that only which lieth loosely, may be drawne forth. As for *Ash*, though it be used for Cups, yet wee like it not. And touching the Operation upon the *Bloud*, thus much.

The Operation upon the Juices of the Body. 4.

The History.



Here are two kindes of *Bodies*, (as was said before in the *Inquisition* touching *Inanimates*) which are hardly consumed; *Hard* things, and *Fat* things, as is seen in *Metals* and *Stones*, and in *Oyle* and *Wax*.

It must be ordered therefore, that the *Juice* of the *Body*, bee somewhat hard, and that it be *fatty*, or *subrescide*.

As for *hardnesse*, it is caused three wayes; by *Aliment* of a firm Nature, by Cold condensing the skin and flesh; and by *Exercise*, binding and compacting the Juices of the body, that they be not soft and frothy.

As for the Nature of the *Aliment*, it ought to be such as is not easily *Diffipable*: Such as are *Beefe*, *Swines-Flesh*, *Deere*, *Goat*, *Kid*, *Swan*, *Goose*, *Ring-Dove*; Especially if they bee a little powdered: *Fish* likewise salted and dried: *Old Cheese*, and the like.

As for the *Bread*; *Oaten bread*, or *bread* with some mixture of *Pease* in it; Or *Rye bread*, or *Barly bread*, are more solid than *Wheat bread*: and in *Wheat bread* the coarse *Cheat Bread* is more solid than the pure *Manchet*.

The inhabitants of the *Orcades*, which live upon salted fish; and generally all *Fish-eaters*, are long-liv'd.

The *Monks* and *Hermits*, which fed sparingly, and upon dry *Aliment*, attained commonly to a great Age.

Also *Pure water*, usually drunk, makes the Juices of the body lesse frothy; unto which, if for the dulnesse of the spirit, (which, no doubt, in *water* is but little penetrative;) you shall adde a little *Nitre*, we conceive it would bee very good. And touching the the *Firmnesse* of the *Aliment*, thus much.

As for the *Condensation* of the skin, and *Flesh*, by cold: They are longer liv'd, for the most part, that live abroad in the open *Aire*, than they that live in *Houses*; and the Inhabitants of the cold *Countries*, than the Inhabitants of the *hott*.

Great store of cloathes, either upon the bed, or back, do resolve the body.

Washing the body in cold water, is good for length of life: Use of hot Baths is naught. Touching Baths of *Astringent* minerall waters, we have spoken before.

As for *exercise*; an idle life, doth manifestly make the flesh soft and dissipable: *Robust exercise* (so it be without overmuch sweating or wearinesse,) maketh it hard and compact. Also *exercise* within cold water, as swimming, is very good: And generally, *exercise* abroad is better than that within houses.

Touching *Frications*, (which are a kinde of *exercise*) because they doe rather call forth the *Aliment*, than harden the flesh; wee will inquire hereafter in the due place.

Having now spoken of *hardning* the Juices of the body, we are to come next to the *Oleosity*, or *Fattiness* of them: which is a more perfect and potent Intention, than *Induration*; because it hath no inconvenience, nor evill annexed: For all those things which pertain to the *hardning* of the Juices, are of that nature, that while they prohibite the absumption of the *Aliment*, they also hinder the operation of the same: Whereby it happens, that the same things are both propitious and adverse to length of life: But those things which pertain to making the Juices oyle, and *Roscid*, help on both sides; For they render the *Aliment* both lesse *Diffipable*, and more *Reparable*.

But whereas we say, that the *Juice* of the body ought to be *Roscid*, and *Fat*, it is to noted, that we meane it not of a visible *Fat*, but of a *Dewinesse* dispersed, or (if you will call it) *Radical* in the very substance of the body.

Neither again, let any man think, that *Oyle*, or the *Fat* of *Meats*, or *marrow*, do engender the like, and satisfie our Intention: For those things which are once perfect, are not brought back again; but the *Aliments* ought to be such, which after *Digestion* and *Maturation*, doe then in the end, engender *Oleosity* in the Juices.

Neither again, let any man think, that *Oyle* or *Fat* by it selfe, and Simple, is Hard of *Diffipation*, but in Mixture it doth not retaine the same Nature: For as *Oyle* by it selfe, is much longer in consuming, than *water*; so in *Paper*, or *Linnen*, it sticketh longer, and is later dried, as we noted before.

To the Irroration of the body, roasted meats, or baked meats, are more effectually than boiled meats : and all preparation of meat with water, is inconvenient : Besides, Oyle is more plentifully extracted out of dry bodies, than out of moist bodies.

Generally, to the Irroration of the body, much use of sweet things is profitable, as of Sugar, Honey, sweet Almonds, Pine-apples, Pistaccio's, Dates, Raisins of the Sunne, Corans, Figs, and the like. Contrarily, all soure and very salt, and very biting things, are opposite to the generation of Rosside Juyce.

Neither would we be thought to favour the Manichees, or their diet, though wee commend the frequent use of all kindes of seedes, and kernels, and roots in meats, or fauces ; considering all bread (and bread is that which maketh the meat firme) is made either of seeds or roots.

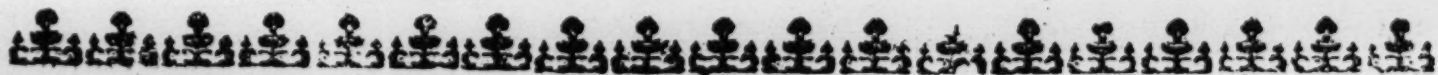
But there is nothing makes so much to the Irroration of the body, as the qualitie of the drink ; which is the convoy of the meat : therefore let there be in use such drinkes, as without all acrimony, or sournesse, are notwithstanding subtile ; such are those wines, which are (as the old woman said in Plautus) *vetustate edentula*, toothlesse with age ; and Ale of the same kinde.

Mead (as we suppose) would not be ill, if it were strong and old : But because all Honey hath in it some sharp parts ; (as appears by that sharp water which the Chymists extract out of it, which will dissolve metals ;) It were better to make the same potion of Sugar ; not lightly infused in it, but so incorporated, as Honey useth to bee in Mead ; And to keep it to the age of a yeare, or at least six Moneths, whereby the Water may lose the crudity, and the Sugar acquire subtilty.

Now ancientnesse in Wine or Beere, hath this in it ; That it ingenders subtilty in the Parts of the liquor, and Acrimony in the Spirits ; whereof the first is profitable, and the second hurtfull : Now to rectifie this evill commixture, let there be put into the vessel before the wine be separated from the Must, Swines flesh, or Deeres flesh, well boiled ; that the Spirits of the Wine may have whereupon to ruminate and feed ; and so lay aside their mordacity.

In like manner, if Ale should be made, not onely with the graines of Wheat, Barley, Oats, Pease, and the like ; but also should admit a part (suppose a third part, to these graines,) of some fat roots ; (such as are Potado Roots, Pith of Artichokes, Burre-Rootes, or some other sweet and esculent Roots,) we suppose it would be a more usefull drink for long life, than Ale made of Graines onely.

Also, such things as have very thin parts, yet notwithstanding are without all Acrimony, or Mordacity, are very good Sallets : which vertue we finde to bee in some few of the Flowers ; namely Flowers of Ivy, which infused in vinegar, are pleasant even to the taste ; Marygold-leaves, which are used in broaths ; and Flowers of Betony. And touching the operation upon the Juyces of the Body, thus much.



The Operation upon the Bowels for their Extrusion of Aliment. 5.

The History.



That those things are which comfort the Principall Bowels ; which are the fountaines of Concoction ; Namely, the Stomach, Liver, Heart, and Brain ; To perform their Functions well ; (whereby Aliment is distributed into the parts, Spirits are dispersed, and the Reparation of the whole body is accomplished,) may be derived from Physitians, and from their Prescripts and Advices.

Touching the Spleen, Gall, Kidneyes, Mesentery, Guts, and Lungs, we speak not ; For these are members ministring to the principall : And whereas speech is made touching Health, they require sometimes a most especiall consideration, because each of these have their diseases, which unlesse they be cured, will have influence upon the Principall Members : But as touching the prolongation of Life, and Reparation by Aliments ; and Retardation of the Inconcoction of Old Age ; If the Concoctions, and those

those *Principall Bowels* be well disposed: The rest will commonly follow according to ones wish.

3 And as for those things which according to the different state of every mans body, may be transferred into his diet, and the Regiment of his Life; hee may collect them out of the bookes of Physicians, which have written of the comforting and preserving the foure *Principall members*: For Conservation of health hath commonly need of no more than some short courses of Physick; but length of life cannot be hoped, without an orderly diet, and a constant race of *soveraigne medicines*: but we will propound some few, and those the most select and prime Directions.

4 The *Stomach*, (which, as they say, is the Master of the House, and whose strength and goodnesse is fundamentall to the other concoctions,) ought so to be guarded and confirmed; that it may bee without *Intemperatenesse* Hot; Next *Astricted* or bound, not *Loose*: Furthermore, *Cleane*, not surcharged with foule Humours; and yet, (in regard it is nourished from it selfe, not from the Veines) not altogether *Emptie*, or *Hungry*; Lastly, it is to bee kept ever in *Appetite*; because *Appetite* sharpens *Digstion*.

5 I wonder much, how that same *Calidum bibere*, to drink warm drink, (which was in use amongst the Ancients) is laid down again. I knew a Physician that was very famous, who in the beginning of dinner and supper, would usually eat a few spoonfuls of very warm *broath*, with much greedinesse; and then would presently wish, that it were out again, saying, *He had no need of the broath, but onely of the warmth*.

6 We doe verily conceive it good, that the first draught either of *Wine*, or *Ale*, or any other *Drink*, (to which a man is most accustomed) be taken at Supper warm.

7 Wine, in which *Gold* hath been quenched, we conceive would be very good once in a Meale: Not that we believe the *gold* conferreth any vertue thereunto; but that wee know, that the quenching of all Metals in any kind of liquor, doth leave a most potent *Astriction*: Now we chuse *gold*, because besides that *Astriction*, which we desire, it leaveth nothing else behind it, of a metalline impression.

8 We are of opinion, that sops of bread dipped in wine, taken at the midst of the meale, are better than wine it selfe; especially if there were infused into the wine, in which the sops were dipped, *Rosemary* and *Citron pill*; and that with *Sugar*, that it may not slip too fast.

9 It is certaine, that the use of *Quinces* is good to strengthen the Stomach: But wee take them to be better, if they be used in that which they call *Quiddeny* of *Quinces*, than in the bodies of the *Quinces* themselves; because they lie heavie in the stomach. But those *Quiddanies* are best taken after meales alone; before meales dipped in *Vinegar*.

10 Such things as are good for the Stomach above other Simples, are these, *Rosemary*, *Elecampane*, *Masticke*, *Wormwood*, *Sage*, *Mint*.

11 We allow pills of *Aloes*, *Mastick*, and *Saffron*, in Winter time, taken before Dinner; but so as the *Aloes* be not only oftentimes washed in *Rosewater*, but also in *Vineger* in which *Tragacanth* hath been infused; and after that, be macerated for a few houres, in oyle of sweet *Almonds* new drawn, before it be made into pills.

12 *Wine* or *Ale*, wherein *Wormwood* hath been infused, with a little *Elecampane*, and yellow *Sanders* will do well, taken at times, and that especially in Winter.

13 But in Summer a draught of white wine, allayed with *Strawbery-water*; in which Wine, powder of Pearles, and of the shels of *Crey-fishes*, exquisitely beaten; and (which may perhaps seem strange,) a little chalk have been infused, doth excellently refresh and strengthen the Stomach.

14 But generally, all *Draughts* in the morning (which are but too frequently used) of cooling things; (as of Juices, Decoctions, Whey, Barley-waters, and the like,) are to bee avoided; and nothing is to be put into the Stomach fasting, which is purely Cold. These things are better given, if need require, either at five in the afternoone, or else an houre after a light breakfast.

15 Often Fastings are bad for long life; besides, all thirst is to bee avoided; and the stomach is to be kept clean, but alwayes moist.

16 Oyle of *Olives* new and good, in which a little *Mitbridate* hath been dissolved, anointed upon the back-bone, just against the mouth of the stomach, doth wonderfully comfort the stomach.

17 A small bagge filled with lockes of Scarlet-wooll steeped in red Wine; in which

Myrtle, and *Citron Pill*, and a little *Saffron*, have been infused, may be alwayes worn upon the stomach. And touching those things which comfort the stomach, thus much: Seeing many of those things also which serve for other operations, are helpfull to this.

The *Liver*, if it be preserved from *Torrefaction*, or *Desiccation*, and from *Obstruction*, it needeth no more: For that loosnesse of it which begets *Aquosities*, is plainly a Disease; but the other two, old age approaching induceth.

Hereunto appertain most especially, those things which are set down in the *Operation* upon the *blood*: we will adde a very few things more, but those selected.

Principally let there be in use the wine of sweet *Pomegranates*: or if that cannot bee had, the juyce of them newly expressed; let it be taken in the morning, with a little *Sugar*: And into the glasse, into which the Expression is made, put a small peece of *Citron pill* green, and three or foure whole *Cloves*: Let this be taken from *February*, till the end of *Aprill*.

Bring also into use, above all other herbs, *Water-cresser*; but young, not old: They may be used either raw, in *Sallets*, or in *Broaths*, or in *Drinkes*: And after that take *Spoon-wort*.

Aloes, howsoever washed or corrected, is hurtfull for the *Liver*: And therefore it is never to be taken ordinarily. Contrariwise, *Rhubarbe* is soveraigne for the *Liver*; So that these three cautions be interposed. First, that it be taken before meat, lest it dry the body too much, or leave some impressions of the *Stipticity* thereof. Secondly, that it be macerated an houre or two in oyle of sweet *Almonds* new drawn, with *Rose-water*, before it be infused in liquor, or given in the proper substance. Thirdly, that it be taken by turnes, one while simple, another while with *Tartar*, or a little *Bay Salt*; That it carry not away the lighter parts onely, and make the masse of the *Humours* more ob-
stinate.

I allow wine, or some decoction with steale to bee taken three or foure times in the yeare, to open the more strong obstructions; yet so, that a draught of two or three spoonfulls of oyle of sweet *Almonds* new drawn, ever goe before; and the motion of the body, especially of the *Armes* and *Sides*, constantly follow.

Sweetned liquors, and that with some fatnesse, are principally, and not a little effectuall to prevent the *Arefaction* and *saltnesse*, and *Torrefaction*, and in a word, the *Oldnesse* of the *Liver*; especially if they be well incorporated with age: They are made of sweet Fruits and Roots, as namely, the *Wines* and *Julips*, of *Raisins* of the *Sunne* new, *Jujubab's*, dried *Figges*, *Dates*, *Parfnips*, *Potado's*, and the like, with the mixture of *Licorish* sometimes: Also a *Julip* of the *Indian* grain (which they call *Maiz*) with the mixture of some sweet things, doth much to the same end. But it is to bee noted, That the intention of preserving the *Liver*, in a kinde of Softnesse and Fatnesse, is much more powerfull than that other, which pertaines to the opening of the *Liver*; which rather tendeth to health than to length of life, saving that that *Obstruction* which induceth *Torrefaction*, is as opposite to long life, as those other *Arefactions*.

I commend the Roots of *Succory*, *Spinage*, and *Beets* cleared of their piths, and boiled till they be tender, in water, with a third part of white wine, for ordinary sallets, to bee eaten with Oyle and Vinegar: Also *Asparagus*, pith of *Artichokes*, and *Burre-roots* boiled and served in after the same manner: Also broaths in the Spring time, of *Vine-buds*, and the green blades of *Wheat*. And touching the preserving of the *Liver*, thus much.

The *Heart* receiveth benefit or harm most from the *Aire*, which wee breath; from *Vapours*, and from the *Affections*. Now many of those things which have been formerly spoken touching the *Spirits*, may be transferred hither: But that indigested masse of *Cordials* collected by *Physicians*, avails little to our Intention: Notwithstanding those things which are found to bee good against poysons, may with good judgement be given to strengthen and fortifie the *Heart*, especially if they bee of that kinde, that they doe not so much resist the particular poysons, as arm the *Heart* and *Spirits* against poyson in generall. And touching the severall *Cordials*, you may repaire to the *Table* already set down.

The goodnesse of the *Aire* is better known by experience than by signes, We hold that aire to be the best, where the Countrey is levell and plain; and that layeth open on all sides: so that the soile be dry, and yet not barren or sandy: which puts forth

Wilde Thime, and *Eye-bright*, and a kinde of *Marjoram*, and here and there stalks of *Calamint*: which is not altogether void of wood, but conveniently set with some trees for shade: where the *Sweet-bryer-rose* smelleth something Musky, and Aromatically; If there be *Rivers*, we suppose them rather hurtfull than good, unlesse they be very small, and cleare, and gravelly.

28] It is certain, that the *morning Aire* is more lively and refreshing, than the *evening aire*, though the latter be preferred out of delicacy.

29 We conceive also, that the *Aire stirred* with a *gentle winde*, is more wholesome than the *Aire* of a *serene* and *calme skie*: but the best is, the *winde* blowing from the *West* in the morning, and from the *North* in the *Afternoone*.

30 *Odours* are especially profitable for the comforting of the *Heart*; yet not so, as though a good *odour* were the prerogative of a good *Aire*: For it is certaine, that as there are some *Pestilentiaill Aires*, which smell not so ill as others that are lesse hurtfull; so on the contrary, there are some *Aires* most wholesome and friendly to the *Spirits*, which either smell not at all, or are lesse pleasing and fragrant to the sense. And generally, where the *Aire* is good, *odours* should be taken but now and then: for a continuall *Odour*, though never so good, is burthensome to the *Spirits*.

31 We commend above all others (as we have touched before) *odour* of plants growing, and not plucked, taken in the open *Aire*; the principall of that kinde are *Violets*, *Gilliflowers*, *Pinkes*, *Bean-flowers*, *Lime-tree-blossoms*, *Vine-buds*, *Hony-suckles*, *Yellow Wall-flowers*, *Musk-Roses*; (for other *Roses* growing, are fast of their smells) *Strawbery-leaves*, especially dying; *sweet Bryar*, principally in the early Spring, *wild Mint*, *Lavender flowered*: And in the hotter Countries, *Orange-tree*, *Citron-tree*, *Mirtle*, *Lawrell*: Therefore to walk, or sit, neare the breath of these *Plants*, would not be neglected.

32 For the comforting of the *Heart*, we preferre coole smells before hot smells: Therefore the best perfume is, either in the morning, or about the heat of the day, to take an equall portion of *Vinegar*, *Rose-water*, and *Claret-wine*, and to poure them upon a *Fire-pan* somewhat heated.

33 Neither let us be thought to sacrifice to our Mother the *Earth*; though wee advise, that in *Digging*, or *Plowing* the *Earth*, for health, a good quantity of *Claret-wine* be powdered thereon.

34 *Orange-flower water*, pure and good, with a small portion of *Rose-water*, and *Briske wine*, snuffed up into the nostrils, or put up into the nostrils with a *Syringe*, after the manner of an *Errhine*; (but not too frequently) is very good.

35 But *Champing* (though we have no *Beitel*;) or holding in the mouth onely of such things as cheere the *Spirits*, (even daily done) is exceeding comfortable. Therefore for that purpose make *Grains*, or little *Cakes* of *Amber-grise*, *Muske*, *Lignum Aloes*, *Lignum Rhodium*, *Orris powder*, and *Roses*; and let those *Graines*, or *Cakes*, bee made up with *Rose-water*, which hath passed through a little *Indian Balsame*.

36 The *Vapours* which arising from things inwardly taken, doe fortifie and cherish the *Heart*, ought to have these three properties; That they be *Friendly*, *Cleare*, and *Cooling*. For hot *vapours* are Nought, and wine it selfe, which is thought to have onely an heating *vapour*, is not altogether void of an *Opiale quality*. Now wee call those *vapours* *Cleare*, which have more of the *vapour*, than of the *Exhalation*; and which are not smoaky, or fuliginous, or unctuous; but moist, and equall.

37 Out of that unprofitable Rabble of *Cordials*, a few ought to be taken into daily diet: In stead of all, *Amber-grise*, *Saffron*, and the grain of *Kermes*, of the hotter sort: Rootes of *Buglosse*, and *Borrage*, *Citrons*, *sweet Limons*, and *Permaines*, of the colder sort. Also that way which we said, both *Gold* and *Pearls*. work a good effect, not onely within the veines, but in their passage, and about the parts neer the heart; Namely by cooling, without any malignant quality.

38 Of *Bezoar stone*, we beleeve wel, because of many trialls: but then the manner of taking it, ought to be such, as the vertue thereof may more easily bee communicated to the *Spirits*. Therefore we approve not the taking of it in *broaths*, or *syrups*, or in *Rose-water*, or any such like; but onely in *Wine*, *Cynamom-water*, or the like distilled water, but that, weak, or small, not burning, or strong.

39 Of the *Affections* we have spoken before, we onely adde this, That every *Noble*, and *Resolute*, and (as they call it) *Heroicall Desire*, strengtheneth and enlargeth the powers of the heart. And touching the heart, thus much.

As for the *Braine*, where the Seate, and Court of the *Animall Spirits*, is kept: Those Things which were inquired before, touching *Opium*, and *Nitre*, and the *Subordinates* to them both: Also touching the *procuring* of *Placide Steepe*; May likewise be referred hither. This also is most certaine; That the *Braine* is in some sort, in the Custody of the *Stomach*; And therefore those Things, which comfort, and strengthen the *Stomach*, doe help the *Braine*, by Consent; And may, no lesse, be transferred hither. We will adde a few Observations; Three Outward, one Inward.

40

Wee would have *Bathing* of the *Feet*, to be often used; At least, once in the weeke; And the *Bath* to be made, of *Lye*, with *Bay-salt*, And a little *Sage*, *Camomile*, *Fennell*, *Sweet-Marjoram*, and *Pepper-wort*, with the Leaves of *Angellica*, green.

41

We commend also, a *Fume*, or *suffumigation*, every Morning, of dried *Rose-Mary*, *Bay-leaves* dried, and *Lignum Aloes*: For all Sweet Gums, oppresse the Head.

42

Especially Care must be taken, that no *Hot Things* be applied to the *Head*, outwardly; Such are all kinde of *Spices*, the very *Nutmeg* not excepted: For those *Hot Things*, we debase them to the soales of the *Feet*, and would have them applied there onely: But a light anointing of the *Head* with *Oyle*, mixed with *Roses*, *Myrtle*, and a little *Salt*, and *Saffron*, we much commend.

43

Not forgetting those Things, which we have before delivered, touching *Opiates*, *Nitre*, and the like, which so much condense the *Spirits*; wee thinke it not impertinent to that Effect: That once in fourteene dayes, Broath bee taken, in the Morning, with three, or foure Graines of *Castoreum*, and a little *Angellica Seed*, and *Calamus*; Which both fortifie the *Braine*; And in that aforesaid Density, of the Substance, of the *Spirits*, (so necessary to Long Life;) Adde also a *Vivacitie* of *Motion*, and *Vigour* to them.

44

In Handling, the *Comforters*, of the four *Principall Bowels*, we have propounded those Things, which are both proper, and choice, and may safely, and conveniently be transferred into Diet, and Regiment of Life: For Varietie of *Medicines*, is the Daughter of Ignorance; And it is not more true, That *Many Dishes* have caused many *Diseases*, As the Proverb is; Then this is true, That many *Medicines* have caused few Cures. And touching the *Operation* upon the *principall Bowels*, for their *Extrusion*, of *Aliment*, thus much.

45



The Operation upon the Outward Parts, for their Attraction of Aliment. 6.

The History.

Although a good *Concoction*, performed by the *Inward Parts*, be the principall, towards a perfect *Alimentation*; yet the *Actions* of the *Outward Parts*, ought also to concur; That like as the *Inward Facultie*, sendeth forth, and extrudeth the *Aliment*, so the *Facultie* of the *Outward Parts*, may call forth, and attract the same; And the more weake the *Facultie* of *Concoction*, shall be, the more need is there of a concurring Help, of the *Attractive Facultie*.

1

A Strong *Attraction* of the *Outward Parts*, is chiefly caused by the *Motion* of the *Body*; By which, the *Parts* being Heated and Comforted, doe more cheerfully call forth, and attract the *Aliment* unto themselves.

2

But this is most of all to be foreseen and avoided, that the same *Motion* and Heat, which calls the new *Juyce* to the *Members*, doth not againe dispoile the *Member* of that *Juyce*, wherewith it had been before refreshed.

3

Frications used in the Morning, serve especially to this Intention; But this must evermore accompany them, that after the *Frication*, the *Part* bee lightly anointed with *Oyle*, lest the Attrition of the *Outward Parts*, make them by *Perpiration*, Dry, and *Juyce-lesse*.

4

The next is *Exercise*, (by which the *Parts* confriate, and chafe themselves,) so it

5

be Moderate ; And which, (as was noted before,) be not Swift, nor to the utmost Strength, nor unto wearinesse. But in Exercise, and in Friction, there is the same Reason and Caution, that the Body may not perspire, or exhale too much : Therefore Exercise is better in the open Aire, than in the House ; And better in Winter, than in Summer: and again, exercise is not only to be concluded with Unction, as Friction is : But in vehement Exercises, Unction is to be used both in the beginning, and in the end ; As it was anciently to *Champions*.

6 That Exercise, may resolve, either the Spirits, or the Juices, as little as may be, it is necessary that it be used when the Stomach is not altogether empty. And therefore, that it may not be used upon a full Stomach, (which doth much concerne Health ;) Nor yet upon an empty Stomach, (which doth no lesse concern Long Life,) It is best to take a Breakfast in the Morning ; Not of any Physicall Drugs, or of any Liquors, or of Raisins, or of Figs, or the like ; But of plaine Meat, and Drink ; yet that very light, and in moderate Quantitie.

7 Exercises, used for the Irrigation of the Members, ought to be equall to all the Members : Not, (as *Socrates* said,) that the Legs should move, and the Armes should rest ; Or, on the contrary ; But that all the parts may participate of the motion. And it is altogether requisite to long Life, that the Body should never abide long in one posture, but that every halfe houre, at least, it change the posture, saving onely in Sleep.


8 Those things which are used to *Mortification*, may be transferred to *Vivification*: For both Haire Shirts, and Scourgings, and all vexations of the outward parts, doe fortifie the Attractive force of them.

9 *Cardan* commends *Netling* ; Even to let out *Melancholy* : But of this we have no Experience ; And besides, we have no good opinion of it, lest through the venomous Quality of the Nettle, it may with often use, breed Itches, and other Diseases of the Skin. And touching the Operation, upon the Outward Parts, for their Attraction of Aliment, thus much.



The Operation upon the Aliment it selfe, for the Insinuation thereof. 7.

The History.

1  He vulgar Reproofe, touching many Dishes, doth rather become a severe Reformer, than a Physician ; Or howsoever it may be good for preservation of Health yet it is hurtfull to Length of Life : By reason, that a various mixture of Aliments, and somewhat Heterogeneous, findes a passage into the veines and juices of the Body, more lively and cheerfully than a Simple, and Homogeneous Diet doth : Besides, it is more forcible, to stirre up Appetite, which is the Spur of Digestion. Therefore we allow, both a *Fall Table*, and a continuall changing of Dishes, according to the Seasons of the yeare, or upon other occasions.

2 Also that Opinion, of the Simplicity of Meates, without sawces, is but a simplicitie of Judgement : For good, and well chosen sawces, are the most wholesome preparations of Meats, and conduce both to Health, and to long Life.

3 It must be ordered, that with Meates hard of Digestion, be conjoynd strong Liquors, and Sawces that may penetrate, and make way ; But with Meats more easie of Digestion, smaller Liquors, and Fat Sawces.

4 Whereas we advised before, that the first Draught at supper should be taken warme ; Now we adde, that for the preparation of the Stomach, a good Draught of that Liquor (to which every man is most accustomed) be taken warm half an houre before Meate also ; but a little spiced to please the Taste.

5 The Preparation of Meats, and Bread, and Drinkes, that they may be rightly handled, and in order to this Intention ; Is of exceeding great Moment ; Howsoever it may seeme a Mechanicall thing, and favouring of the Kitchen, and Buttry : Yet it is of more consequence, than those Fables, of Gold, and Precious Stones, and the like.

The

The Moistning of the Juices of the body, by a moist preparation of the Aliments, is a childish thing: It may be somewhat availeable against the Fervours of Diseases; But it is altogether averse to a Roscide Alimentation. Therefore boyling of Meats, as concerning our Intention, is farre Inferiour to Roasting and Baking, and the like.

Roasting ought to be with a quick fire, and soon dispatched; Not with a dull fire, and in long time.

All Solide Fleshes, ought to be served in, not altogether Fresh, but somewhat powdered, or corned: The lesse Salt may be spent at the Table with them, or none at all: For Salt incorporated with the Meat before, is better distributed in the Body, than eaten with it at the Table.

There would be brought into use severall and good *Macerations*, and *Infusions* of Meats, in convenient Liquors, before the Roasting of them: The like whereof are sometimes in use before they bake them; And in the Pickles of some Fishes.

But *Beatings*, and as it were *Scourgings* of Flesh Meats, before they be boiled, would work no small matter. We see, it is confessed, that *Partridges*, and *Pheasants*, killed with an *Hawke*; Also *Bucks*, and *Stags* killed in Hunting; (If they stand not out too long) eat better, even to the Taft. And some Fishes, scourged, and beaten, become more tender, and wholesome. Also hard, and sowre *Peares*, and some other Fruits, grow sweet with rowling them. It were good to practise some such Beating and Bruising, of the harder kindes of Fleshes, before they be brought to the Fire. And this would be one of the best preparations of all.

Bread, a little leavened, and very little salted, is best: And which is baked in an oven, thorowly heated, and not with a faint heat.

The Preparation of Drinks in order to long Life, shall not exceed one precept. And as touching *Water Drinkers*, we have nothing to say; Such a Diet (as we said before) may prolong life to an Indifferent Terme, but to no Eminent length: But in other Drinks, that are full of Spirit, (such as are *Wine*, *Ale*, *Mead*, and the like) this one thing is to be observed, and pursued, as the summe of all; That the parts of the *Liquour* may be exceeding Thin and Subtile; And the *Spirit* exceeding Mild: This is hard to be done by *Age* alone; For that makes the parts a little more subtile; But the Spirits much more sharp and eager: Therefore of the *Infusion* in the vessels, of some fat Substance, which may restraints the Acrimony of the Spirits, counsell hath been given before: There is also another way, without *Infusion*, or *Mixture*: This is, that the *Liquour* might be continually agitated; Either by carriage upon the water, or by carriage by Land; or by hanging the vessels upon lines, and daily stirring them; or some such other way: For it is certaine, that this *local Motion*, doth both subtilize the parts; And doth so incorporate, and compact the Spirits with the parts; That they have no leisure to turne to sowrenesse, which is a kinde of *Putrefaction*.

But in extreme *old Age*, such a preparation of Meats is to be made, as may be almost in the Middle-way to *Chylus*; And touching the *Distillations* of Meats, they are meere Toyes: For the Nutritive part, at least the best of it, doth not ascend in *Vapours*.

The Incorporating of Meat and Drink, before they meet in the Stomach, is a degree to *Chylus*; Therefore let *Cbickens*, or *Partridges*, or *Pheasants*, or the like, bee taken, and boiled in water, with a little salt; then let them be cleansed, and dried; Afterward let them be infused in *Mast*, or *Ale* before it hath done working, with a little *Sugar*.

Also *Gravies* of Meat, and the *Mincings* of them small, well seasoned; Are good for *old Persons*; And the rather, for that they are destituted of the office of their *Teeth*, in chewing, which is a principall kinde of preparation.

And as for the Helps of that Defect, (Namely, of the strength of *Teeth* to grinde the Meat,) There are three things, which may conduce thereunto. First, that new *Teeth* may put forth; That which seems altogether difficult, and cannot bee accomplished, without an Inward, and powerfull Restauration of the body. Secondly, that the *Laws* be so confirmed by due *Astringents*, that they may in some sort supply the office of the *Teeth*; which may possibly be effected. Thirdly, that the Meat be so prepared, that there shall be no need of chewing; which remedy is ready, and at hand.

We have some Thought also, touching the *Quantity*, of the meat and drink; that the same taken in larger *Quantity*, at some times, is good for the *Irrigation* of the *Body*. Therefore both *Great Feastings*, and *Free Drinkings*, are not altogether to be inhibited. And touching the *Operation* upon the *Aliments*, and the *Preparation* of them, thus much.

The Operation upon the last Act of Assimilation. 8.

Touching the last Act of Assimilation, (unto which the three Operations, immediately preceding, chiefly tend) our Advice shall be briefe, and single. And the Thing it selfe, rather needs Explication, than any various Rules.



It is certaine, that all Bodies are endued with some desire of *Assimilating* those things which are next them: this the Rare and Pneumaticall Bodies, *Flame, Spirit, Aire*, perform generously, and with alacrity; On the contrary, those that carry a grosse, and tangible bulke about them, doe but weakely: In regard, that the Desire of *Assimilating* other Things, is bound in by a stronger desire of Rest, and containing themselves from Motion.

Againe, it is certaine, That desire of *Assimilating*, being bound, as we said, in a Crosse body, and made uneffectuall; is somewhat freed, and stirred up, by the *Heat*, and *Neighbouring Spirit*; So that it is then Actuated: which is the onely cause why *Inanimates Assimilate* not, and *Animates Assimilate*.

This also is certaine, that the harder the Consistence of the Body is, the more doth that Body stand in need of a greater Heate, to prick forward the *Assimilation*: Which falls out ill for old Men; because in them the parts are more obstinate, and the heate weaker: And therefore, either the obstinacy of their parts is to be softned, or their heat increased. And as touching the *Malaciffation*, or *Mollifying* of the Members, we shall speake afterward; Having also formerly propounded many things, which pertaine to the prohibiting and preventing of this kinde of hardnesse. For the other, touching the Increasing of the heate, we will now deliver a single precept; After we have first assumed this *Axiome*.

The Act of *Assimilation*, (which, as we said, is excited, by the Heat circumsfused,) is a Motion exceeding Accurate, Subtile, and in Little. Now all such Motions do then come to their Vigour, when the *Locall Motion* wholly ceaseth, which disturbeth it. For the Motion of *Separation*, into *Homogeneall* parts, which is in Milke; That the Creame should swim above, and the Whey sink to the bottome, will never work, if the Milk be never so little agitated: Neither will any *Putrefaction* proceed in Water, or Mixt Bodies, if the same be in continuall *Locall Motion*. So then, from this *Assumption*, wee will conclude this for the present Inquisition.

The Act it selfe, of *Assimilation*, is chiefly accomplished in Sleep and Rest; Especially towards the Morning, the Distribution being finished: Therefore we have nothing else to advise, but that Men keep themselves hot in their Sleep: And further, that towards the Morning, there be used some Anointing, or Shirt tinted with Oyle, such as may gently stir up heat; And after that, to fall asleep again. And touching the Last Act of *Assimilation*, thus much.

The Operation upon the Inteneration of that, which begins to be
Arified; Or the Malaciffation of the Body. 9.

We have inquired formerly, touching the Inteneration from within; which is done by many Windings, and Circuits, as well of Alimentation, as of Detaining the Spirit from issuing forth; And therefore is accomplished slowly: Now we are to inquire touching that Inteneration, which is from without; And is effected, as it were, suddenly; Or touching the Malaciffation, and Suppling of the Body.

The History.



IN the Fable of restoring Pelias to Youth againe, Medea, when she faigned to do it, propounded this way, of accomplishing the same; That the Old Mans Body should be cut into severall Peeces; And then boyled in a Cauldron, with certaine Medicaments. There may, perhaps, some Boyling be required to this matter; But the cutting into peeces is not needfull.

Notwithstanding this cutting into peeces seemes, in some sort, to be usefull ; Not with a Knife, but with Judgement. For whereas the Consistence of the *Bowels*, and *Parts* is very divers ; It is needfull that the *Inteneration* of them both be not effected the same way ; But that there be a Cure designed of each in particuler ; Besides those things which pertaine to the *Inteneration* of the whole Masse of the Body ; Of which, notwithstanding, in the first place.

This *Operation*, (if perhaps it be within our power) is most likely to be done by Baths, Unctions, and the like : Concerning which, these things that follow, are to be observed.

We must not be too forward in hoping to accomplish this matter from the Examples of those Things which wee see done in the *Imbibitions*, and *Macerations* of *Inanimates* : By which they are intenerated : whereof we introduced some Instances before : For this kinde of operation is more easie upon *Inanimates*, Because they attract, and suck in the Liquor ; But upon the Bodies of Living Creatures it is Harder ; Because in them the Motion rather tendeth outward, and to the *Circumference*.

Therefore the *Emollient Baths* which are in use, do little good, but on the contrary, hurt ; Because they rather draw forth, than make entrance ; And resolve the structure of the Body, rather than consolidate it.

The *Baths*, and *Unctions*, which may serve to the present *Operation*; (Namely, of *Intenerating* the Body, truly and really,) ought to have three properties.

The First and principall, is; That they consist of those *Things* which in their whole Substance, are like unto the *Body* and *Flesh* of *Man*; And which have a *Feeding*, and *Nursing* Vertue, from without.

The Second is, That they be mixed with such things as through the *Subtlety* of their *Parts* may *Make Entrance*, and so insinuate, and conveigh their *Nourishing Vertue* into the *Body*.

The Third is, That they receive some *Mixture* (though much inferiour to the rest) of such things as are *Astringent* ; I meane not Sowre, or Tart things, but Unctuous, and Comforting ; That while the other two doe operate, the Exhaling out of the Body, which destroyeth the Vertue of the Things *Intenerating*, may (as much as is possible) be prohibited ; And the Motion to the Inward Parts, by the *Astriction* of the Skin, and closing of the Passages, may be promoted and furthered.

That which is most *Consubstantiall* to the Body of *Man*, is *Warne Bloud*, either of *Man*, or of some other living Creature : But the device of *Ficinus*, Touching the Sucking, of *Bloud* out of the *Arme* of a wholesome young *Man* ; For the Restoration of Strength in Old men, is very frivolous ; For that which nourisheth from within, ought no way to be Equall, or Homogeneall to the Body nourished ; But in some sort, Inferiour, and Subordinate, that it may be converted : But in Things applyed outwardly, by how much the *Substance* is *Liker*, by so much the *Consent* is better.

It hath been anciently received, That a Bath made of the *Bloud* of *Infants* will cure the *Leprosie*, and heale the *Flesh* already putrified : Insomuch that this thing hath begot Envy towards some *Kings* from the Common people.

It is reported, that *Heraclitus* for cure of the *Drop sic*, was put into the *Warm Belly* of an *Oxe* newly slain.

They use the *bloud* of *Kittlins* warme, to cure the *Disease* called *Saint Antonies Fire*; And to restore the *Flesh* and *Skin*.

An *Arme*, or other *Member* newly cut off; Or that upon some other occasion will not leave *bleeding*, is, with good successe, put into the *belly* of some *Creature* newly ripped up; For it worketh potently to Stanch the *Bloud* ; The blood of the Member cut off, by consent sucking in, and vehemently drawing to it self the warme *bloud* of the *Creature* flaine ; whereby it self is stopped, and retireth.

It is much used in extreme and desperate *Diseases*, to cut in two young *Pigeons*, yet living, and apply them to the *Soles* of the *Feet*: and to shift them one after to another, whereby sometime there followeth a wonderfull ease. This is imputed vulgarly as if they should draw down the *Malignity* of the *Disease* ; But howsoever this Application goeth to the *Head*, and comforteth the *Animal Spirits*.

But these *Bloudy Baths* and *Unctions* seeme to us fluttish and odious : Let us search out some others, which perhaps have lesse loathsomenesse in them, and yet no lesse Benefit.

17 Next unto *Warm-blood*, Things alike in Substance, to the Body of Man, are, *Nutritives*,
Fat Fleshes; Of *Oxen*, *Swine*, *Deere*: *Oysters* amongst *Fishes*; *Milke*, *Butter*, *yolkes of Eggs*:
Floure of Wheat, *Sweet Wine*, either Sugred, or before it bee fined.

18 Such things as we would have mixed to make Impression are, in stead of all; *Salts*,
 especially *Bay-salt*; Also *Wine* (when it is full of *Spirit*,) maketh Entrance; And is
 an excellent Convoy.

19 *Astringents* of that kinde, which we described; Namely *Unctuous* and *Comfortable*
 things are, *Saffron*, *Mastick*, *Myrrbe*, and *Myrtle-Berries*.

20 Of these Parts, in our judgement, may very well be made such a *Bath* as we designe:
Physicians and *Posteritie* will finde out better things hereafter.

21 But the *Operation* will be much better, and more powerfull; If such a *Bath* as wee
 have prounded (which we hold to be the principall Matter, be attended with a *Foure-*
fold Course and *Order*.

22 First, that there goe before the *Bath*, a *Frication* of the Body; And an *Anointing*
 with *Oyle*, with some thickning Substance: That the *Vertue*, and *Moistning* heate of
 the *Bath* may pierce the Body, and not the watry part of the *Liquour*. Then let the
Bath follow, for the space of some two *Houres*: After the *Bath*, let the Body be *Em-*
plastrd with *Mastick*, *Myrrbe*, *Tragacanth*, *Diapalma*, and *Saffron*; That the *Perspira-*
tion of the Body, may (as much as is possible) be inhibited; Till the *Supple Matter* be
 by degrees turned into *solide*: This to bee continued, for the space of twenty foure
 houres, or more. Lastly, the *Emplastring* being removed, let there bee an *Anointing*
 with *Oyle*, mixed with *Salt* and *Saffron*. And let this *Bath*, together with the *Em-*
plastring and *Unction* (as before) be renewed every fifth day: This *Malaciffation*, or
Suppling of the Body, to be continued for one whole *Moneth*.

23 Also during the time of this *Malaciffation*, we hold it usefull and proper, and accor-
 ding to our *Intention*, that men nourish their bodies well, and keep out of the cold
Aire, and drinke nothing but warm *Drinke*.

24 Now this is one of those Things (as we warned, in generall in the beginning)
 whereof we have made no *Triall* by *Experiment*; but onely set it downe, out of our
Aiming and *Levelling* at the *End*. For having set up the *Mark*, we deliver the *Light* to
 others.

25 Neither ought the *Warmths* and *Cherishings* of *Living Bodies*, to bee neglected. *Fi-*
cinus saith, and that seriously enough, *That the laying of the young Maide in Davids Bo-*
some, was wholesome for him, but it came too late. Hee should also have added, *That the*
young Maide, after the manner of the *Persian Virgins*, ought to have been anointed
 with *Myrrbe*, and such like; Not for deliciousnesse, but to increase the vertue of this
Cherishing by a living Body.

26 *Barbarossa*, in his extreme old Age, by the advice of a *Physician*, a *Jew*, did continu-
 ally apply young *Boyes* to his *Stomach* and *Belly*, for *Warmth* and *Cherishing*: Also
 some Old men lay *Whelps* (*Creatures of the hottest kinde*) close to their *Stomachs*
 every night.

27 There hath gone a report, almost undoubted; And that under severall Names; Of
 certaine men that had great *Noses*, who being weary of the derision of people, have cut
 off the *Bunches* or *Hillocks* of their *Noses*; And then making a wide *Gash* in their
Armes, having held their *Noses* in the place for a certaine time; And so brought forth
 fair and comely *Noses*: Which if it be true, it shewes plainly, the *Consent* of *Flesh* unto
Flesh, especially in *Live Fleshes*.

28 Touching the particular *Inteneration* of the *Principall Bowels*; The *Stomach*, *Lungs*,
Liver, *Heart*, *Braine*, *Marrow of the Backbone*, *Guts*, *Reines*, *Gall*, *Veines*, *Arteries*, *Nerves*,
Cartilages, *Bones*; The *Inquisition* and *Direction*, would be too long; Seeing we now
 set not forth a *Practique*; But certain *Indications* to the *Practique*.

The Operation upon the Purging away of old *Juyce*, and Supplying of new *Juyce* ; Or of Renovation by Turnes. 10.

The History.

ALthough those things which we shall here set downe, have been, for the most part, spoken of before; yet because this Operation is one of the principall, we will handle them over again, more at large.

It is certaine, that Draught Oxen, which have been worne out with working, being put into fresh, and rich Pastures, will gather tender and young Flesh againe; And this will appeare, even to the Taste and Palate; So that the Inteneration of Flesh, is no hard Matter. Now it is likely, that this Inteneration of the Flesh, being often repeated, will in time reach to the Iteration of the Bones and Membranes, and like Parts of the Body.

It is certaine, that Diets which are now much in use; Principally of *Guaiacum*, and of *Sarsaperilla*, *China*, and *Sassafras*; If they bee continued for any time, and according to strict Rules; Doe first Attenuate the whole *Juyce* of the Body; And after consume it, and drinke it up. Which is most manifest, because that by these Diets, the French Pox, when it is growne even to an hardnesse, and hath eaten up, and corrupted the very Marrow of the Body, may be assuredly cured. And further, because it is as manifest, that Men, who by these Diets, are brought to be extreme Leane, Pale, and as it were Ghosts, will soon after become Fat, well-coloured, and apparently Young again. Wherefore we are absolutely of opinion, that such kind of Diets in the decline of age, being used every year, would be very usefull to our Intention; Like the old Skin, or Spoile of Serpents.

We doe confidently affirme, (neither let any Man reckon us amongst those Hereticks, which were called *Cathari*;) that often Purges and made even Familiar to the Body, are more availeable to long Life, than Exercises and Sweats. And this must needs bee so, if that be held, which is already laid for a ground; That Unctions of the Body, and Oppletion of the passages from without, and Exclusion of Aire, and detaining of the Spirit, within the Masse of the Body, doe much conduce to long Life. For it is most certaine, that by Sweats and outward Perspirations; not onely the Humours and excrementitious Vapours are Exhaled and consumed; But together with them, the Juices also, and good Spirits, which are not so easily repaired; But in Purges (unlesse they be very immoderate,) it is not so; Seeing they worke principally upon the Humours. But the best Purges for this Intention, are those, which are taken immediately before Meat; Because they dry the Body lesse; And therefore, they must be of those Purgers, which doe least trouble the Belly.

These Intentions, of the Operations, which we have propounded (as we conceive) are most true; The Remedies Faithfull to the Intentions. Neither is it credible to be told (Although not a few of these Remedies may seeme but vulgar) with what Care and Choice they have been examined by us; That they might be (the Intention not at all impeached) both Safe and Effectuall. Experience, no doubt, will both verifie, and promote these Matters. And such, in all things, are the Workes of every prudent Counsell; That they are Admirable in their Effects, Excellent also in their Order, but seeming vulgar in the Way and Meanes.

The Porches of Death.

WE are now to inquire touching the Porches of Death; That is, touching those things which happen unto men, at the point of Death; Both a little before, and after. That seeing there are many Paths, which lead to Death, it may be understood in what Common-way

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way, they all end; Especially in those Deaths, which are caused by Indigence of Nature, rather than by violence; Although something of this latter also, must be inserted, because of the Connexion of Things.

The History.



THE Living Spirit stands in need of three things, that it may subsist: Convenient Motion, Temperate Refrigeration, and Fit Aliment. Flame seems to stand in need but of two of these; Namely, Motion, and Aliment: Because Flame is a simple substance, the Spirit a Compounded: Inasmuch, that if it approach somewhat too neare to a Flamy Nature, it overthroweth it selfe.

Also Flame by a greater and stronger Flame is extinguished and flaine; As Aristotle well noted, much more the Spirit.

Flame if it much compressed and straitned, is extinguished; As wee may see in a Candle having a Glasse cast over it; For the Aire being dilated by the heate, doth contrude and thrust together the Flame; And so lesseneth it, and in the end extinguisheth it: And Fires on hearths will not Flame, if the Fewell be thrust close together without any space for the Flame to breake forth.

Also things fired are extinguished with compression: As if you presse a burning coale hard with the Tongs, or the Foot, it is straight extinguished.

But to come to the Spirit; If Blood or Flegme get into the Ventricles of the Braine, it causeth sudden Death; Because the Spirit hath no Roome to move it selfe.

Also a great Blow on the Head, induceth sudden Death, the Spirits being straitned within the Ventricles of the Brain.

Opium, and other stronge Stupratives, doe coagulate the Spirit, and deprive it of the Motion.

A Venemous Vapour, totally abhorred by the spirit, causeth sudden Death: As in deadly poisons, which worke (as they call it) by a specificall Malignity: For they strike a loathing into the Spirit, that the Spirit will no more move it selfe, nor rise against a thing so much detested.

Also extreme Drunkenesse, or extreme Feeding, sometime cause sudden Death: Seeing the Spirit is not onely Oppressed with overmuch Condensing, or the malignity of the Vapour (as in Opium, and malignant Poysons) but also with the abundance of the Vapours.

Extreme Griefe, or Feare, especially if they be sudden (as it is in a sad, and unexpected Message) cause sudden Death.

Not onely over-much Compression, but also over-much Dilatation of the Spirit, is Deadly.

Joyes excessive and sudden have bereft many of their lives.

In great Evacuations, as when they cut men for the Dropisie, the waters flow forth abundantly; Much more in great and sudden Fluxes of Blood oftentimes present Death followeth: And this happens by the meere flight of Vacuum within the Body; All the parts moving to fill the Empty places; And amongst the rest, the Spirits themselves. For as for slow Fluxes of Blood, this matter pertaines to the Indigence of Nourishment, not to the Diffusion of the Spirits. And touching the Motion of the Spirit, so farre, either Compressed or Diffused, that it bringeth Death, thus much.

We must come next to the want of Refrigeration. Stopping of the breath causeth sudden Death: As in all suffocation, or strangling. Now it seems this matter is not so much to be referred to the Impediment of motion, as to the Impediment of Refrigeration: For Aire over-hot, though attracted freely, doth no lesse Suffocate, than if Breathing were hindred: As it is in them, who have been sometime suffocated with Burning coales, or with Char-coale, or with Walls newly plaistered, in close chambers, where a fire is made: which kind of death is reported to have been the end of the Emperour Iovinian: The like happeneth from dry Baths over-heated, which was practised in the killing of Fausta, wife to Constantine the Great.

It is a very small time, which Nature taketh, to repeat the Breathing; And in which

which she desireth to expell the foggy aire drawn into the *Lungs*, and to take in new, scarce the third part of a minute.

Again, the beating of the *Pulse*, and the motion of the *Systole*, and *Diastole* of the Heart, are three times quicker than that of breathing; inso much that if it were possible that that motion of the heart could be stopped, without stopping the breath, Death would follow more speedily thereupon, than by strangling.

Notwithstanding use and custome prevaile much in this naturall action of breathing, as it is in the Delian Divers, and Fishers for Pearle; who by long use can hold their breaths at least ten times longer than other men can doe.

Amongst living Creatures, even of those that have *Lungs*, there are some that are able to hold their breaths a long time, and others that cannot hold them so long; according as they need more or lesse Refrigeration.

Fishes need lesse Refrigeration than *Terrestriall Creatures*; yet some they need, and take it by their Gills. And as *Terrestriall Creatures* cannot beare the Aire that is too Hot, or too Close; So *Fishes* are suffocated in waters, if they be totally and long frozen.

If the Spirit be assaulted by another heat, greater than it selfe, it is dissipated, and destroyed. For it cannot beare the proper heat without Refrigeration, much lesse can it beare another heat which is farre stronger. This is to be seen in *burning Fevers*, where the heat of the putrified humours doth exceed the native heat even to extinction, or dissipation.

The want also, and use of *Sleep*, is referred to Refrigeration. For motion doth attenuate and rarifie the Spirit; and doth sharpen and increase the heat thereof: Contrarily, *Sleep* setteth and restraineth the motion and gadding of the same. For though *Sleep* doth strengthen and advance the Actions of the parts, and of the livelesse Spirits; and all that motion, which is to the Circumference of the body; yet it doth in great part, quiet and still the proper motion of the *Living Spirit*. Now sleep regularly, is due unto humane Nature, once within foure and twenty houres; and that for six, or five houres at the least: Though there are, even in this kinde, sometimes Miracles of Nature; As it is recorded of *Mecenas*, that hee slept not for a long time before his death. And as touching the want of Refrigeration, for conserving of the Spirit, thus much.

As concerning the third Indigence; namely of *Aliment*: It seemes to pertain rather to the Parts than to the *living Spirit*. For a man may easily believe, that the *living Spirit* subsisteth in Identity; not by succession or renovation. And as for the *Reasonable Soul* in man, it is above all question, that it is not engendred of the Soul of the parents, nor is repaired, nor can die. They speak of the *Naturall Spirit* of living creatures; and also of Vegetables, which differs from that other Soul essentially and formally. For out of the confusion of these, that same transmigration of Soules, and innumerable other devices of Heathens and Heretickes, have proceeded.

The body of man doth regularly require Renovation by *Aliment*, every day. And a body in health can scarce endure fasting three dayes together; notwithstanding use and custome will doe much even in this case; but in sicknesse fasting is lesse grievous to the body. Also *Sleep* doth supply somewhat to nourishment; And on the other side Exercise doth require it more abundantly. Likewise there have some been found, who sustained themselves, (almost to a miracle in Nature,) a very long time, without meat or drink.

Dead Bodies, if they be not intercepted by putrefaction, will subsist a long time, without any notable Absumption; But *living bodies* not above three dayes (as we said) unlesse they be repaired by nourishment: which sheweth, that quicke Absumption to bee the work of the *living Spirit*; which either repairs it self, or puts the parts into a necessity of being repaired, or both. This is testified by that also which was noted a little before; namely, that *living creatures* may subsist somewhat the longer, without *Aliment*, if they sleep. Now sleep is nothing else but a reception and retirement of the *living Spirit* into it selfe.

An abundant and continuall Effluxion of blood, which sometimes happeneth in the *Hemorrhoides*; sometimes in vomiting of blood, the inward Veines being unlocked, or broken, sometimes by wounds, causeth sudden death; in regard, that the blood of the *Veines* ministrerh to the *Arteries*; and the blood of the *Arteries* to the Spirit.

26 The quantity of meat and drink, which a man, eating two meales a day, receiveth into his body, is not small; much more than he voideth again either by stoole or by urine, or by sweating. You will say, No marvell, seeing the remainder goeth into the Juyces and Substance of the body: It is true; but consider then, that this addition is made twice a day, and yet the body aboundeth not much. In like manner, though the Spirit be repaired, yet it growes not excessively in the quantity.

27 It doth no good to have the Aliment ready, in a degree removed; but to have it of that kinde; and so prepared and supplied, that the Spirit may work upon it; For the Staffe of a Torch alone will not maintain the flame, unlesse it bee fed with wax: Neither can men live upon Herbs alone. And from thence comes the *Inconcoction* of old Age, that though there be flesh and blood, yet the Spirit is become so penurious and thin, and the juyces and blood so heartlesse and obstinate, that they hold no proportion to *Alimentation*.

28 Let us now cast up the *Accounts* of the *Needs* and *Indigences*, according to the ordinary and usuall course of Nature: The Spirit hath need of opening and moving it selfe in the *Ventricles* of the brain and nerves even continually; Of the motion of the *Heart* every third part of a moment; of breathing every moment; of sleep and nourishment once within three dayes; of the power of nourishment commonly till eighty yeares be past. And if any of these *Indigences* bee neglected, *Death* ensueth. So there are plainly three *Porches* of *Death*; *Destitution* of the Spirit; In the *Motion*, in the *Refrigeration*, in the *Aliment*.

It is an error to thinke, that the Living Spirit is perpetually generated and extinguished, as Flame is; and abideth not any notable time. For even Flame it selfe is not thus, out of his own proper Nature; But because it liveth amongst enemies. For Flame within Flame endureth. Now the Living Spirit liveth amongst Friends, and all due *Obsequiousnesse*: So then, as Flame is a momentary Substance; Aire is a fixed Substance; the Living Spirit is betwixt both.

Touching the Extinguishing of the Spirit by the Destruction of the Organs, (which is caused by Diseases and Violence,) we enquire not now, as we foretold in the beginning; Although that also endeth in the same three *Porches*. And touching the Form of Death it selfe, thus much.

29 There are two great *Fore-runners* of *Death*, the one sent from the *Head*, the other from the *Heart*; *Convulsion* and the extream labour of the *Pulse*. For as for the deadly *Hiccough*, it is a kinde of *Convulsion*. But the deadly labour of the *Pulse* hath that unusuall swiftnesse; because the *Heart* at the poynt of *Death*, doth so tremble, that the *Systole*, and *Diastole* thereof, are almost confounded. There is also conjoynd in the *Pulse*, a weaknesse and lownesse, and oftentimes a great *Intermission*; because the motion of the heart faileth, and is not able to rise against the assault stoutly, or constantly.

30 The immediate preceding signes of *Death* are, great unquietnesse, and tossing in the bed, fumbling with the hands, catching and grasping hard, gnashing with the Teeth, speaking hollow, trembling of the neather lip, palenesse of the face, the memory confused, speechlesnesse, cold sweats, the body shooting in length, lifting up the white of the eye, changing of the whole visage, (as the Nose sharp, eyes hollow, cheekes fallen) contraction and doubling of the coldnesse in the *Extream parts* of the body; in some, shedding of blood, or sperme, shrieking, breathing thick and short, falling of the neather chap, and such like.

31 There follow *Death*, a privation of all sense and motion, as well of the *Heart* and *Arteries*, as of the *Nerves* and *Joynts*; an inability of the body to support it selfe upright, stifnesse of the *Nerves* and *Parts*, extream coldnesse of the whole body; after a little while, putrefaction and stinking.

32 *Eeles*, *Serpents*, and the *Insecta*, will move a long time in every part after they are cut asunder; insomuch that Countrey people think, that the parts strive to joyn together again. Also *Birds* will flutter a great while after their heads are pulled off: And the *Hearts* of living Creatures will pant a long time after they are plucked out. I remember I have seen the heart of one that was bowelled; as suffering for high *Treason*, that being cast into the fire, leaped at the first, at least a foot and halfe in height; and after by degrees lower and lower, for the space, as we remember, of seven or eight minutes. There is also an ancient and credible tradition, of an *Ox* Lowing after his bowels were plucked out. But there is a more certaine tradition of a Man, who being under the

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Executioners hand for high Treason; after his *Heart* was plucked out, and in the Executioners hand, was heard to utter three or foure words of prayer: which therefore we said to be more credible than that of the *Ox* in *Sacrifice*; because the friends of the party suffering, doe usually give a reward to the Executioner, to dispatch his Office with the more speed, that they may the sooner be rid of their pain; but in *Sacrifices*, we see no cause why the Priest should be so speedy in his Office.

For *Reviving* those again which fall into sudden *Swoonings*, and *Catalepses*, or *Assonishments*: (in which Fits, many, without present help, would utterly expire;) These things are used; Putting into their mouthes water distilled of Wine, which they call *Hot waters*, and *Cordiall waters*; bending the body forwards, stopping the Mouth and Nostrils hard, bending or wringing the fingers, pulling the haire of the beard, or head; rubbing of the parts, especially the Face and Legs, sudden casting of cold water upon the Face, shrieking out aloud, and suddenly; putting *Rose-water* to the Nostrils, with *Vineger* in faintings; burning of Feathers, or Cloth, in the suffocation of the *Mother*; but especially a *Frying-pan* heated red hot, is good in *Apoplexies*: Also a close embracing of the body, hath helped some.

There have been many examples of men in shew dead; either laid out upon the cold floore, or carried forth to buriall; Nay, of some buried in the earth, which notwithstanding have lived again; which hath been found in those that were buried, (the earth being afterwards opened,) by the bruising and wounding of their head, through the strugling of the body within the Coffin: Whereof the most Recent and Memorable example, was that of *Joannes Scotus*, called the *Subtle*, and a *Schoolman*, who being digged up again by his servant, unfortunately absent at his buriall; (and who knew his masters manner in such Fits,) was found in that state. And the like happened in our dayes, in the person of a Player, buried at *Cambridge*. I remember to have heard of a certain *Gentleman*, that would needs make triall in curiosity, what men did feele that were hanged; So he fastened the Cord about his Neck, raising himselfe upon a stoole, and then letting himselfe fall; thinking it should be in his power to recover the stoole at his pleasure, which he failed in; but was helped by a friend then present. Hee was asked afterward, what he felt? He said, He felt no paine; but first, he thought he saw before his eyes a great Fire, and burning: Then he thought he saw all Black, and Darke: Lastly, it turned to a pale blew, or Sea-water Greene; which colour is also often seen by them which fall into *Swoonings*. I have heard also of a Physician, yet living, who recovered a man to life which had hanged himselfe; and had hanged half an houre, by *Frications*, and hot Baths: And the same Physician did professe; that he made no doubt to recover any man, that had hanged so long, so his Neck were not broken with the first Swing.



The Differences of Youth and old Age.

The Ladder of Mans Body is this, To be conceived, to be quickned in the Womb, to be born, to suck, to be weaned, to feed upon Pap, to put forth Teeth, the first time about the second yeare of Age; to begin to goe, to begin to speak, to put forth teeth the second time, about seven yeares of Age, to come to *Puberty* about twelve or fourteen yeares of age, to be able for generation, and the flowing of the *Menstrua*, to have hairs about the Legges and Arme-holes, to put forth a Beard; And thus long, and sometimes later, to grow in stature, to come to full yeares of strength and agility, to grow gray and bald; The ceasing of the *Menstrua*, and ability to generation, to grow decrepit, and a Monster, with three Legges, to die. Mean while the minde also hath certain periods; but they cannot be described by yeares, as to decay in the *Memory*, and the like; of which hereafter.

The Differences of Youth and Old Age, are these. A young mans skin is smooth, and plain; an old mans dry, and wrinkled; especially about the forehead and eyes: A young mans flesh is tender and soft, an old mans hard; A young man hath strength and agility, an old man feelles decay in his strength, and is slow of motion: A young man hath

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hath good digestion, an old man bad: A young mans bowels are soft and succulent, an old mans, salt and parched: A young mans body is erect and straight, an old mans bowing and crooked: A young mans limbs are steady, an old mans weak and trembling: the humours in a young man are cholerick, and his blood inclined to heat; in an old man phlegmatick and melancholick, and his blood inclined to coldnes: a young man ready for the act of *Venus*, an old man slow unto it: in a young man the juyces of his body are more Roscide, in an old man more crude and watrish: the Spirit in a young man plentiful and boiling, in an old man scarce and jejune: A young mans spirit is dense and vigorous, an old mans eager and rare: A young man hath his senses quick and entire, an old man dull and decayed: A young mans Teeth are strong and entire, an old mans weak, worn, and falling out: A young mans haire is coloured, an old mans of what colour soever it were, gray: A young man hath haire, an old man baldnesse: A young mans pulse is stronger and quicker, an old mans more confused and slower: The diseases of young men are more acute and curable, of old men longer and hard to cure: A young mans wounds soon close, an old mans later: A young mans cheeks are of a fresh colour, an old mans pale, or with a black blood: A young man is lesse troubled with Rhumes, an old man more. Neither doe we know in what things old men doe improve, as touching their body, save onely sometimes in fatnesse; whereof the Reason is soon given; Because old mens bodies doe neither perspire well, nor assimilate well. Now Fatnesse is nothing else but an exuberance of nourishment, above that which is voided by excrement; or which is perfectly assimilated. Also, some old men improve in the appetite of feeding, by reason of the *Acide humours*; though old men digest worst. And all these things which we have said, *Physicians* negligently enough will referre to the *Dimination* of the *Naturall heat*, and *Radical Moisture*: Which are things of no worth for use. This is certain, *Driness* in the coming on of yeares, doth foregoe *Coldnes*: and bodies when they come to the top, and strength of heat, doe decline in *Driness*; and after that followes *Coldnes*.

3

Now we are to consider the *Affections* of the *Mind*. I remember when I was a young man at *Poitiers* in *France*, I conversed familiarly with a certain *Frenchman*; a witty young man, but something talkative; who afterwards grew to be a very eminent man: he was wont to inveigh against the manners of *Old men*; and would say, That if their *Mind*s could be seen, as their *Bodies* are, they would appeare no lesse deformed. Besides, being in love with his own wit, he would maintain, That the vices of old Mens *mindes*, have some correspondence, and were paralell to the putrefactions of their *bodies*: For the driness of their skin, he would bring in *Impudence*; for the hardnesse of their bowels, *Unmercifulnesse*; For the Lippitude of their eyes, an *evill Eye*, and *Envy*; For the casting downe of their eyes, and bowing their body towards the earth, *Atheisme*; (for, saith he, they looke no more up to heaven, as they were wont;) For the trembling of their members, *Irresolution* of their *Decrees*, and *light inconstancy*; for the bending of their fingers, as it were to catch, *Rapacity* and *Covetousnesse*: for the buckling of their knees, *fearfulnesse*; for their wrinkles, *Craftinesse* and *Obliquity*: And other things which I have forgotten. But to be serious, a young man is modest and shamefast, an old mans forehead is hardned: A young man is full of bounty and mercy, an old mans heart is brawny: A young man is affected with a laudable Emulation, an old man with a malignant envy: A young man is inclined to Religion and Devotion, by reason of his fervency and inexperience of evill; an old man cooleth in piety, through the coldnesse of his Charity, and long conversation in evill; and likewise, through the difficulty of his beliefe: A young mans desires are vehement, an old mans moderate: A young man is light and moveable, an old man more grave and constant: A young man is given to liberality and beneficence, and humanity; an old man to covetousnesse, wisdom for his own selfe, and seeking his own ends: A young man is confident, and full of hope; an old man diffident, and given to suspect most things: A young man is gentle and obsequious, an old man froward and disdainfull: A young man is sincere and open hearted, an old man cautelous and close: A young man is given to desire great things, an old man to regard things necessary: A young man thinkes well of the present times, an old man preferreth times past before them: A young man reverenceth his superiours, an old man is more forward to tax them. And many other things, which pertain rather to manners, than to the present inquisition. Notwithstanding old men, as in some things they improve in their bodies, so also in their *mindes*, unlesse they be altogether out of date. Namely; that as they are lesse apt for invention,

tion, so they excell in judgement, and prefer safe Things, and sound things before specious; Also they improve in Garrulity and Ostentation; For they seek the Fruite of Speech, while they are lesse able for Action; So as it was not absurd, that the Poets fained old *Tibon*, to be turned into a *Grashopper*.



Moveable Canons, of the Duration of Life, and
Forme of Death.

Canon I.

Consumption is not caused, unlesse that, which be departed with by one Body, passeib into another.

The Explication.

There is in Nature no *Annihilation*, or *Reducing to Nothing*: Therefore that which is consumed, is either resolved into Aire, or turned into some Body Adjacent; So we see a *Spider*, or *Fly*, or *Ant*, in Amber, Entombed in a more stately Monument than Kings are, to be laid up for Eternity; Although they be but tender things, and soon dissipated. But the matter is this, that there is no Aire by, into which they should be resolved; And the *Substance* of the *Amber* is so *Heterogeneous*, that it receives nothing of them. The like we conceive would be, if a Stick or Root, or some such thing were Buried in *Quick-silver*. Also *Wax*, and *Honey*, and *Gums* have the same Operation, but in part onely.

Canon II.

There is in every Tangible body a Spirit, covered and encompassed with the Groffer Parts of the Body; And from it all Consumption and Dissolution, bath the Beginning.

The Explication.

NO Body known unto us here in the upper part of the Earth is without a Spirit; Either by *Attenuation*, and *Concoction* from the heat of the Heavenly Bodies; Or by some other way. For the *Concavities* of *Tangible Things*, receive not *Vacuum*; But either Aire, or the proper Spirit of the Thing. And this Spirit whereof we speak, is not some *Vertue*, or *Energie* or *Act*, or a *Trifle*; But plainly a Body, rare, and invisible; Notwithstanding circumscribed by place, Quantitative, Reall: Neither again, is that Spirit Aire, (no more than Wine is water) But a Body rarified, of kin to Aire, though much different from it. Now the Groffer parts of Bodies (being dull things, and not apt for Motion) would last a long time; But the Spirit is that which troubleth and plucketh, and undermineth them, and converteth the Moisture of the Body, and whatsoever it is able to digest, into new Spirit; And then as well the *Præ-existing* Spirit of the Body, as that newly made, fly away together by degrees. This is best seen by the *Diminution* of the *Weight* in Bodies dried, through *Perspiration*. For neither, all that which is issued forth was spirit, when the Body was ponderous; neither was it not spirit, when it issued forth.

Canon III.

The Spirit issuing forth, dryeth; Detained and working within, either Melteth, or Putrifieth, or Vivifieth.

The Explication.

There are four Processes of the Spirit; To *Arefaction*; To *Colliquation*; To *Putrefaction*; To *Generation* of bodies. *Arefaction* is not the proper Work of the Spirit, but of the Groffer parts, after the Spirit issued forth: For then they contract themselves partly by their flight of *Vacuum*, partly by the *Union* of the *Homogeneals*; As appears in all things which are Arified by Age: And in the drier sort of bodies, which have passed the Fire; As *Bricks*, *Charcoales*, *Bread*. *Colliquation* is the meer worke of the Spirit: Neither is it done but when they are excited by heate: For then, the Spirits dilating themselves, yet not Getting forth, do insinuate, and disperse themselves amongst the Groffer parts; And so make them soft, and apt to run, as it is in *Metals*, and *Wax*: For *Metals*, and all *Tenacious* things, are apt to inhibit the Spirit, that being excited

excited, it issueth not forth. *Putrefaction* is a mixed worke of the *Spirits*, and of the Groffer parts: For the Spirit (which before restrained and bridled the parts of the thing) being partly issued forth, and partly enfeebled; All things in the body do dissolve and returne to their *Homogeneities*, or (if you will) to their Elements: That which was spirit in it, is congregated to it selfe, whereby things Putrified beginne to have an ill favour: The Oyle parts to themselves, whereby things putrified have that Slipperinesse and Unctuosity: The watry parts also to themselves: The Dregs to themselves; Whence followeth that *Confusion* in *Bodies Putrified*. But *Generation*, or *Vivification* is a Work also mixed of the Spirit and Groffer parts, but in a farre different manner: For the Spirit is totally detained, but it swelleth and moveth locally; And the Groffer parts are not dissolved, but follow the motion of the Spirit, and are, as it were, blown out by it, and extruded into divers figures; From whence commeth that *Generation*, and *Organization*: And therefore *Vivification* is alwaies done in a Matter Tenacious, and Clammy: And againe, Yeelding and Soft, that there may be both a Detention of the spirit, and also a gentle Cession of the parts, according as the spirit forms them. And this is seen in the Matter, as well of all Vegetables, as of Living Creatures; whether they be engendred of Putrefaction, or of Sperme: For in all these things there is manifestly seen a matter, hard to break thorow, easie to yeeld.

Canon IV.

IN all Living Creatures there are two kinde of Spirits, livelesse Spirits, such as are in bodies Inanimate; And a Vitall Spirit superadded.

The Explication.

IT was said before, that to procure Long Life, the Body of Man must be considered; First, as *Inanimate*, and not Repaired by Nourishment: Secondly, as *Animate*, and Repaired by Nourishment: For the former Consideration gives Lawes touching Consumption; The latter, touching Reparation. Therefore we must know, that there are in Humane Flesh, Bones, Membranes, Organs: Finally in all the parts, such spirits diffused in the substance of them, while they are alive, as there are in the same things (Flesh, Bones, Membranes, and the rest) Separated and Dead; Such as also remaine in a *Carkase*: But the *Vitall Spirit*, although it ruleth them, and hath some consent with them, yet it is farre differing from them; Being integrall, and subsisting by it selfe. Now there are two especiall Differences betwixt the *Livelesse Spirits*, and the *Vitall Spirits*: The one, that the *Livelesse Spirits* are not continued to themselves, but are, as it were, cut off, and encompassed with a Groffe Body, which intercepts them; As *Aire* is mixt in *snow*, or *Froib*: But the *Vitall spirit* is all continued to it selfe, by certaine Conduit Pipes, through which it passeth, and is not totally intercepted. And this Spirit is twofold also; The one branched only passing through small pipes, and, as it were, strings: The other hath a *Cell* also; so as it is not onely continued to it selfe, but also congregated in an hollow space, in reasonable good Quantity, according to the Analogie of the Body: And in that *Cell* is the Fountaine of the Rivulets, which branch from thence. That *Cell* is chiefly in the Ventricles of the Braine, which in the Ignobler sort of Creatures are but narrow; Infomuch that the spirits in them seem scattered over their whole bodie, rather than Celled: As may bee seen in *Serpents*, *Eeles*, and *Flyes*, whereof every of their parts move long after they are cut asunder. Birds also leap a good while after their heads are pulled off, because they have little Heads, and little *Cels*: But the Nobler sort of Creatures have those Ventricles larger: And Man the largest of all. The other difference betwixt the spirits, is, That the *Vitall spirit* hath a kinde of enkindling, and is like a Winde or Breath compounded of Flame and *Aire*, as the Juyces of Living Creatures have both *Oyle* and *Water*. And this enkindling ministreth peculiar Motions and Faculties: For the Smoke, which is inflammable, even before the Flame conceived, is Hot, Thin, and Moveable, and yet it is quite another thing, after it is become Flame: But the enkindling of the *Vitall spirits* is by many Degrees gentler than the softest Flame: As of Spirit of *Wine*, or otherwise: And besides it is in great part mixed with an *Aeriall* substance; That it should be a *Mystery* or *Miracle*, both of a *Flammeous*, and *Aereous* Nature.

Canon V.

THe Naturall Actions are proper to the severall Parts; But it is the Vitall Spirit that excites and sharpens them.

The Explication.

THE *Actions* or *Functions*, which are in the severall *Members*, follow the Nature of the *Members* themselves; (*Attraction, Retention, Digestion, Assimilation, Separation, Excretion, Perspiration, even Sense it selfe;*) According to the Propriety of the severall *Organs*, (*The Stomach, Liver, Heart, Spleene, Gall, Braine, Eye, Eare, and the rest.*) Yet none of these *Actions* would ever have been actuated, but by the Vigour and Presence of the vitall Spirit, and Heat thereof: As one Iron would not have drawn another Iron, unlesse it had been excited by the *Load-stone*; Nor an *Egge* would ever have brought forth a *Bird*, unlesse the Substance of the *Hen* had been actuated by the Treading of the *Cock*.

Canon V I.

THe Livelesse Spirits are next *Consubstantiall* to *Aire*; The Vitall Spirits, approach more to the Substance of *Flame*.

The Explication.

THe Explication of the precedent fourth Canon, is also a declaration of this present Canon: But yet further, from hence it is that all Fat and Oyly Things, continue long in their Being; For neither doth the *Aire* much pluck them; Neither doe they much desire to joyne themselves with *Aire*. As for that conceit, it is altogether vaine; That *Flame* should be *Aire* set on Fire; Seeing *Flame* and *Aire* are no lesse *Heterogeneall* than *Oyle* and *Water*. But whereas it is said in the Canon, That the *Vitall Spirits*, approach more to the Substance of *Flame*; It must be understood, that they doe this more than the *Livelesse Spirits*; Not that they are more *Flamy* than *Airy*.

Canon V II.

THe Spirit hath two Desires: One of Multiplying it self, the other of Flying forth, and Congregating it self with the *Connaturals*.

The Explication.

THe Canon is understood of the *Livelesse Spirits*: For as for the second Desire, the *Vitall Spirit*, doth most of all abhorre flying forth of the body; For it finds no *Connaturals* here below to joyne withall. Perhaps it may sometimes flye to the outward parts of the Body, to meet that which it loveth: But the flying forth, as I said, it abhorreth. But in the *Livelesse Spirits*, each of these two Desires holdeth. For to the former this belongeth; Every Spirit seated amongst the *Grosser Parts* dwelleth unhappily; And therefore when it findes not a like unto it selfe, it doth so much the more labour to create, and make a like: As being in a great Solitude, and endeavour earnestly to multiply it selfe, and to prey upon the *Volatile* of the *Grosser Parts*; that it may be increased in Quantity. As for the Second Desire of Flying forth, and betaking it self to the *Aire*; It is certaine that all Light Things (which are ever Moveable) do willingly go unto their Likes neare unto them: As a Drop of water is carried to a Drop; *Flame* to *Flame*: But much more this is done in the flying forth of Spirit into the *Aire Ambient*; because it is not carried to a Particle like unto it selfe, but also as unto the *Globe* of the *Connaturals*. Meane while this is to be noted, that the *Going forth*, and *Flight* of the Spirit into *Aire*, is a redoubled Action: Partly out of the *Appetite* of the Spirit, partly out of the *Appetite* of the *Aire*: For the *Common Aire* is a needy Thing, and receiveth all things speedily, as *Spirits, Odours, Beams, Sounds*, and the like.

Canon V III.

Spirit Detained, if it have no possibility of begetting new Spirit, intenerateth the *Grosser Parts*.

The Explication.

Generation of new Spirit is not accomplished, but upon those things which are, in some Degree neer to Spirit: Such as are *Humide Bodies*. And therefore if the *Grosser parts* (amongst which the Spirit converseth) be in a remote Degree, although the Spirit cannot convert them, yet (as much as it can) it weakneth, and softneth, and subdueth them, that seeing it cannot increase in Quantitie, yet it will dwell more at large, and live amongst good Neighbours and Friends. Now this *Apborisme* is most usefull to our End; because it tendeth to the Inteneration of the *Obstinate Parts*, by the detention of the Spirit.

Canon I X.

THe Inteneration of the *Harder Parts* cometh to good effect, when the Spirit neither flyeth forth, nor begetteth new Spirit.

The Explication.

THis Canon solveth the Knot and Difficultie in the Operation of Intenerating by the Detention of the Spirit. For if the Spirit not flying forth, wasteth all within, there is nothing gotten, to the Inteneration of the parts in their Subistence; But rather they are dissolved, and corrupted. Therefore together with the Detention, the Spirits ought to be cooled, and restrained; that they may not be too Active.

Canon X.

THe Heate of the Spirit to keepe the Body Fresh and Greene, ought to be Robust, not Eager.

The Explication.

Also this Canon pertaineth, to the solving of the knot aforesaid; But it is of a much larger Extent. For it setteth downe, of what Temperament the Heate in the Body ought to be for the obtaining of Long Life: Now this is usefull, whether the Spirits be detained, or whether they be not. For howsoever, the Heat of the Spirits must be such, as it may rather turne it selfe upon the Hard parts, than waste the Soft; For the one Desiccate, the other Intenerate. Besides, the same Thing is available to the well perfecting of Assimilation; For such an Heat doth excellently excite the Faculty of Assimilation; And withall doth excellently prepare the Matter to be Assimilated. Now the Properties of this kinde of Heate ought to be these. First, that it be Slow, and heat not suddenly: Secondly, that it be not very Intense, but Moderate: Thirdly, that it be Equall, not Incomposed; Namely, Intending and Remitting it selfe: Fourthly, that if this Heat meet any thing to resist it, it be not easily suffocated or languish. This Operation is exceeding subtile, but seeing it is one of the most usefull, it is not to be deserted. Now in those Remedies (which we propounded to invest the Spirits with a Robust Heate; Or, that which we call Operative, not Predatory) we have in some sort satisfied this Matter.

Canon XI.

THe Condensing of the Spirits, in their Substance, is available to long Life.

The Explication.

This Canon is subordinate to the next precedent: For the Spirit condensed, receiveth all those four properties of Heat, whereof we spake: but the wayes of Condensing them are set down in the first of the Ten Operations.

Canon XII.

THe Spirit in great Quantity, hasteneth more to Flying forth, and preyeth upon the Body more than in small Quantitie.

The Explication.

This Canon is cleare of it selfe, seeing meere Quantity, doth regularly increase Vertue. And it is to be seen in Flames, that the bigger they are, the stronger they break forth, and the more speedily they consume. And therefore over great Plenty, or Exuberance of the Spirits is altogether hurtfull to Long Life: Neither need one with a greater store of Spirits than what is sufficient for the Function of Life, and the Office of a good Reparation.

Canon XIII.

THe Spirit equally dispersed, maketh lesse haste to fly forth, and preyeth lesse upon the Body, than unequally placed.

The Explication.

Not onely abundance of Spirits in respect of the whole, is hurtfull to the Duration of Things, but also the same Abundance unevenly placed, is in like manner hurtfull: And therefore the more the Spirit is shred, and inserted by small portions, the lesse it preyeth: For Dissolution ever beginneth at that part, where the Spirit is looser. And therefore both Exercise and Frictions conduce much to long life: For Agitation doth fineliest disfuse and commix things by small Portions.

Canon XIII.

THe Inordinate and Subsultorie Motion of the Spirits doth more hasten to Going forth, and doth prey upon the Body more than the Constant and Equall.

The Explication.

In Inanimates this Canon holds for certaine; For Inequality is the Mother of Dissolution; But in Animates (because not only the Consumption is considered, but the Repara-

Reparation ; and reparation proceedeth by the Appetites of things ; and Appetite is sharpened by variety,) It holdeth not rigorously ; but it is so farre forth to be received, that this variety be rather an alternation, or enterchange, than a confusion, and as it were constant in inconstancy.

Canon X V.

THe Spirit in a Body of a Solide Composure, is detained though unwillingly.

The Explication.

ALL things doe abhorre a solution of their Continuity, but yet in proportion to their Density, or Rarity : For the more Rare the Bodies be, the more doe they suffer themselves to be thrust into small and narrow passages : for water will go into a passage which dust will not goe into ; and Aire, which water will not goe into : Nay, Flame and Spirit, which Aire will not goe into. Notwithstanding of this thing, there are some bounds : For the Spirit is not so much transported with the desire of going forth, that it will suffer it selfe to be too much discontinued, or be driven into over-strait pores and passages : and therefore if the Spirit bee encompassed with an hard body, or else with an *Unctuous* and *Tenacious* (which is not easily divided) it is plainly bound ; and, as I may say, imprisoned, and layeth down the appetite of going out : Wherefore wee see, that *Metals* and *Stones* require a long time for their Spirit to goe forth ; unlesse either the Spirit be excited by the fire, or the grosser parts be dissolved with corroding and strong waters. The like Reason is there of *Tenacious bodies* ; such as are *Gums*, save onely that they are melted by a more gentle heat. And therefore the *juyces* of the body hard, a close and compact skin, and the like, (which are procured by the Drynesse of the Aliment, and by exercise, and by the coldnesse of the aire,) are good for long life ; because they detain the Spirit in close prison, that it goeth not forth.

Canon X V I.

IN Oily and Fat things, the Spirit is detained willingly, though they bee not Tenacious.

The Explication.

THe Spirit, if it be not irritated by the Antipathy of the body enclosing it, nor fed by the over-much likeness of that body ; nor solicited nor invited by the externall body, it makes no great stirre to get out : All which are wanting to Oily bodies : for they are neither so pressing upon the Spirit as hard bodies, nor so neare as watry bodies ; neither have they any good agreement with the aire ambient.

Canon X V I I.

THe Speedy Flying forth of the Watry Humour, conserves the Oily the longer in his Being.

The Explication.

WE said before, that the Watry humours, as being Consubstantiall to the Aire, flye forth soonest ; the Oily later, as having small agreement with the Aire. Now whereas these two Humours are in most bodies, it comes to passe, that the Watry doth, in a sort, betray the Oily ; for that issuing forth insensibly, carrieth this together with it. Therefore there is nothing more furthereth the Conservation of Bodies, than a gentle Drying of them ; which causeth the Watry humour to expire, and inviteth not the Oily : For then the Oily enjoyeth the proper Nature. And this tendeth not only to the Inhibiting of Putrefaction, (though that also followeth,) but to the conservation of Greenesse. Hence it is, that gentle Frictions, and moderate exercises, causing rather Perspiration than Sweating, conduce much to long life.

Canon X V I I I.

Aire excluded, conferreth to Long Life, if other Inconveniencies bee avoided.

The Explication.

WE said a little before, That the Flying forth of the Spirit, is a redoubled Action, from the Appetite of the Spirit, and of the Aire. And therefore if either of these be taken out of the way, there is not a little gained. Notwithstanding divers Inconveniencies follow hereupon ; which how they may be prevented, we have shewed in the second of our Operations.

Canon X I X.

Youthfull Spirits inserted into an Old Body, might soone turne Natures Course backe againe.

The Explication.

THe Nature of the *Spirits* is as the uppermost *Wheele*, which turneth about the other *wheelles* in the body of man. And therefore in the *Intention* of long life, that ought to be first placed. Hereunto may be added, That there is an easier and more expedite way to alter the *Spirits*, than to other *Operations*. For the *Operation* upon the *Spirits* is two-fold, The one by *Aliments*, which is slow, and, as it were, about; The other, (and that two-fold) which is sudden, and goeth directly to the *Spirits*; namely, by *Vapours*, or by the *Affections*.

Canon XX.

Juyces of the Body, Hard and Roscide, are good for long Life.

The Explication.

THe Reason is plain, seeing we shewed before; That *hard* things, and *Oily* or *Ros-*
cide, are hardly dissipated. Notwithstanding there is difference, (as we also noted in the tenth *Operation*) That *Juyce* somewhat hard, is indeed lesse *Dissipable*, but then it is withall lesse *Reparable*. Therefore a *Convenience* is interlaced with an *Inconvenience*; And for this cause no wonderfull matter will bee atchieved by this. But *Roscide Juyce* will admit both *Operations*. Therefore this would be principally endeavoured.

Canon XXI.

Whatsoever is of *Thin Parts*, to penetrate; And yet hath no *Acrimony* to bite, begetteth *Roscide Juyces*.

The Explication.

THis *Canon* is more hard to practise than to understand: For it is manifest, Whatsoever penetrateth well, but yet with a *sting*, or *tooth*; (as doe all sharp and soure things,) it leaveth behinde it, wheresoever it goeth, some mark, or print, of *Drynesse*, and *Cleaving*; so that it hardeneth the *Juyces*, and chappeth the *Parts*. Contrarily, whatsoever things penetrate through their *thinnesse* meerly, as it were by stealth, and by way of *Insinuation*, without violence; they *bedew*, and *water* in their passage: Of which sort we have recounted many in the fourth and seventh *Operations*.

Canon XXII.

Affimilation is best done when all Locall Motion is expended.

The Explication.

THis *Canon* we have sufficiently explained in our Discourse upon the eighth *Operation*.

Canon XXIII.

Alimentation from without, at least some other way than by the *Stomach*, is most profitable for long life, if it can be done.

The Explication.

WE see that all things which are done by *Nutrition*, ask a long time; but those which are done by *Embracing* of the *like*, (as it is in *Infusions*,) require no long time. And therefore *Alimentation* from without, would be of principall use; and so much the more, because the *Faculties* of *Concoction* decay in old age; So that if there could bee some auxiliary *Nutritions*, by *batnings*, *unctions*, or else by *Chylsters*: These things in conjunction might doe much, which single are lesse available.

Canon XXIV.

VHere the *Concoction* is weak to thrust forth the *Aliment*; there the *Outward Parts* should be strengthened, to call forth the *Aliment*.

The Explication.

That which is propounded in this *Canon*, is not the same thing with the former; for it is one thing for the *outward Aliment* to be attracted inward; another for the *Inward Aliment* to be attracted outward: yet herein they concur, that they both help the weaknesse of the *Inward Concoctions*, though by divers wayes.

Canon XXV.

ALL sudden Renovation of the *Body* is wrought either by the *Spirit*, or by *Malaciffations*.

The Explication.

THere are two things in the body; *Spirits* and *Parts*: To both these the way by *Nutrition*, is long and about; but it is a short way to the *Spirits* by *Vapours*, and by the *Affections*; and to the *Parts* by *Malaciffations*: But this is diligently to be noted; that by no means we confound *Alimentation* from without, with *Malaciffation*: for the *Intention* of *Malaciffation*, is not to nourish the parts, but only to make them more fit to be nourished.

Canon

Canon XXVI.

Malaciffation is wrought by *Consubstantials*, by *Imprinters*, and by *Clofers up*.

The Explication.

The Reason is manifest; for that *Consubstantials* do properly fupple the body, *Imprinters* doe carry in, *Clofers up* do retain and bridle the *Perspiration*, which is a motion oppofite to *Malaciffation*. And therefore (as we described in the ninth *Operation*,) *Malaciffation* cannot well be done at once; but in a courfe or order. First, by excluding the *liquour* by *Thickners*; for an outward and groffe *Infufion* doth not well compact the body; that which entreth muft be fubtile, and a kinde of vapour. Secondly, by *Intenerating*, by the consent of *Consubstantials*: For bodies upon the touch of thofe things which have good agreement with them, open themfelves, and relax their pores. Thirdly, *Imprinters* are *Convoyes*, and infinuate into the parts, the *Consubstantials*. And the mixture of gentle *Astringents* doth fomewhat reftrein the *Perspiration*. But then, in the fourth place, followes that great *Affriktion*, and *Clofure* up of the body, by *Emplaftration*; and then afterward by *Imunction*, untill the *Supple* be turned into *Solid*; as we faid in the proper place.

Canon XXVII.

Frequent Renovation of the Parts Reparable, *watereth* and *reneweth* the leffe Reparable alfo.

The Explication.

VV^E faid in the Preface to this History, That the *Way of Death* was this; That the *Parts Reparable* died in the fellowfhip of the *Parts leffe Reparable*; So that in the *Reparation* of thefe fame *leffe Reparable Parts*, all our forces would be employed. And therefore, being admonifhed by *Aristotles* obfervation, touching *Plants*; namely, That the putting forth of new *shoots* and *branches*, *refrefheth* the body of the tree in the *passage*; We conceive the like reason might be, if the *Flefh* and *Blood* in the body of Man, were often renewed, that thereby the *Bones* themfelves, and *Membranes*, and other parts, which in their own nature are *leffe Reparable*; partly by the cheerfull *passage* of the *Juyces*, partly by that new cloathing of the young *Flefh* and *Blood*, might be *watred* and *renewed*.

Canon XXVIII.

Refrigeration, or Cooling of the Body, which paffeth fome other wayes than by the *Stomach*, is *ufefull* for long life.

The Explication.

The Reason is at hand; for fecing a *Refrigeration* not temperate, but powerfull, (efpecially of the *Blood*,) is above all things neceffary to long life; This can by no meanes be effected from within, as much as is requifite, without the *Destruction* of the *Stomach* and *Bowels*.

Canon XXIX.

That *Intermixing*, or *Entangling*, that as well *Consumption*, as *Reparation*, are the *workes of heat*, is the greateft obftacle to long life.

The Explication.

Almoft all great workes are destroyed by the *Natures* of things *Intermixed*, when as that which helpeth in one refpect, hurteth in another: Therefore men muft proceed herein by a found judgement, and a difcreet practice: For our part, we have done fo, as farre as the matter will beare, and our memory ferveth us, by feparating *benigne heats* from *hurtfull*; and the *Remedies* which tend to both.

Canon XXX.

Curing of Difcafes is effected by *Temporary Medicines*; but *Lengthening of Life* requireth *Observation of Diets*.

The Explication.

Thofe things which come by *Accident*, as foon as the *Caufes* are removed, ceafe again; but the continued *Course of Nature*, like a running *River*, requires a continuall rowing and failing againft the stream. Therefore we muft work regularly by *Diets*. Now *Diets* are of two kindes; *Set Diets*, which are to be obferved at certain times; and *Familiar Diet*, which is to be admitted into our daily *Repaft*: But the *Set Diets* are the more potent: That is, a courfe of *Medicines* for a time: For thofe things which are of fo great vertue, that they are able to turn *Nature* back again; are, for the moft part, more ftrong, and more fpeedily altering, than thofe which may without danger be received into a continuall ufe. Now in the *Remedies* fet downe in our *Intentions*, you

shall finde onely three *Set Diets*: The *Opiate Diet*, the *Diet Malacissant*, or *Suppling*; and the *Diet Emaciant*, & *Renewing*. But amongst those which wee prescribed for *Familiar Diet*, & to be used daily, the most efficacious are these that follow; which also come not far short of the verue of *Set diets*. *Nitre*, & the *Subordinates* to *Nitre*; The *Regiment* of the *Affections*, and *Course* of our *Life*; *Refrigeratours* which passe not by the *Stomach*; *Drinkes Roscidating*, or engendring *Oily Juices*; besprinkling of the blood with some *Firmer Matter*, as *Pearles*, certain *Woods*, competent *Unctions* to keep out the *Aire*, and to keep in the *Spirit*; *Heaters* from without, during the *Assimilation* after sleep; avoyding of those things which inflame the *Spirit*, and put it into an *eager heat*, as *Wine* and *Spices*. Lastly, a moderate and seasonable use of those things which endue the *Spirits* with a *Robust heat*; as *Saffron*, *Cresses*, *Garlick*, *Elecampane*, and *Compound Opiates*.

Canon XXXI.

The Living Spirit is instantly extinguished, if it be deprived either of Motion, or of Refrigeration, or of Aliment.

Explication

NAmely, these are those three which before we called the *Porches of Death*; and And they are the proper and immediate passions of the *Spirit*. For all the *Organs* of the principall parts, serve hereunto; That these three *Offices* be performed; and again, all destruction of the *Organs*, which is deadly, brings the *Matter* to this point, that one or more of these three faile. Therefore all other things are the divers wayes to *Death*, but they end in these three. Now the whole *Fabrick* of the *Parts* is the *Organ* of the *Spirit*, as the *Spirit* is the *Organ* of the *Reasonable Soule*; which is *Incorporeous* and *Divine*.

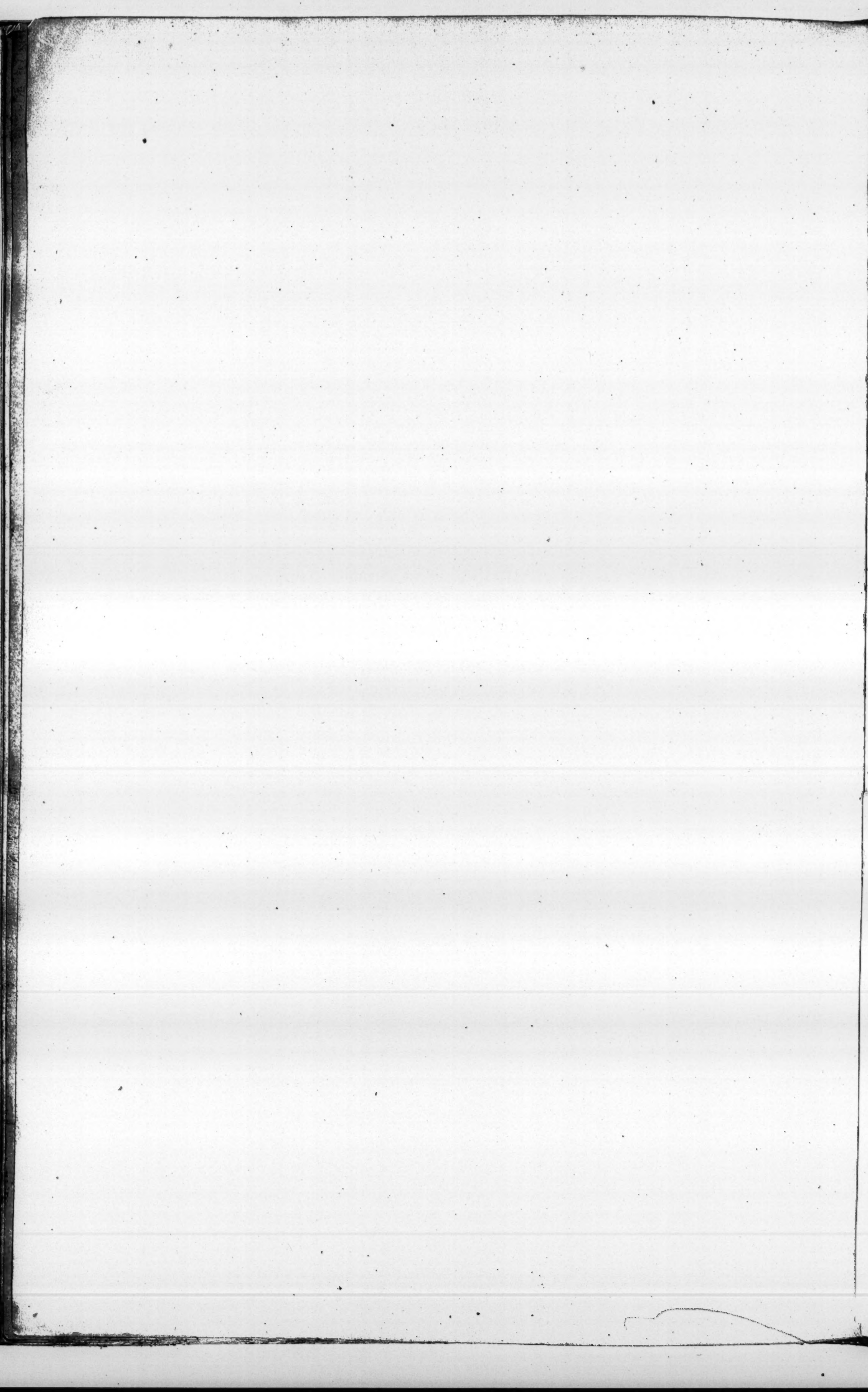
Canon XXXII.

Flame is a Momentany Substance, Aire a Fixed; The Living Spirit in Creatures, is of a Middle Nature.

The Explication.

His Matter stands in need both of an higher Indagation, and of a longer Explication, than is pertinent to the present Inquisition. Meane while, we must know this; That *Flame* is almost every moment generated and extinguished; so that it is continued onely by succession: But *Aire* is a *Fixed Body*, and is not dissolved; For though *Aire* begets new *Aire* out of watry moisture, yet notwithstanding the old *Aire* still remains; whence commeth that *Super-Operation* of the *Aire*, whereof wee have spoken in the Title, *De Ventis*: But *spirit* is participant of both *Natures*; both of *Flame* and *Aire*; Even as the *Nourishments* thereof are; Aswell *Oyle* which is *Homogeneous* to *Flame*; As *Water* which is *Homogeneous* to *Aire*: For the *spirit* is not nourished either of *Oyle* alone, or of *Watry* alone, but of both together; And though *Aire* doth not agree well with *Flame*, nor *Oyle* with *Water*, yet in a *mixt Body* they agree well enough. Also the *spirit* hath from the *Aire*, his easie and delicate Impressions and yeeldings; And from the *Flame* his Noble and Potent motions and activities. In like manner the *Duration* of *Spirit* is a *Mixed Thing*; Being neither so *Momentany* as that of *Flame*; Nor so fixed as that of *Aire*. And so much the rather it followeth not the condition of *Flame*; For that *Flame* it self is extinguished by Accident; namely, by *Contraries* and *Enemies* environing it; But *spirit* is not subject to the like Conditions and Necessities. Now the *spirit* is repaired from the lively and floride blood of the small *Arteries*, which are infetted into the *Braine*; But this *Reparation* is done by a peculiar manner, of which we speake not now.

F I N I S.



Fund Daggett

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